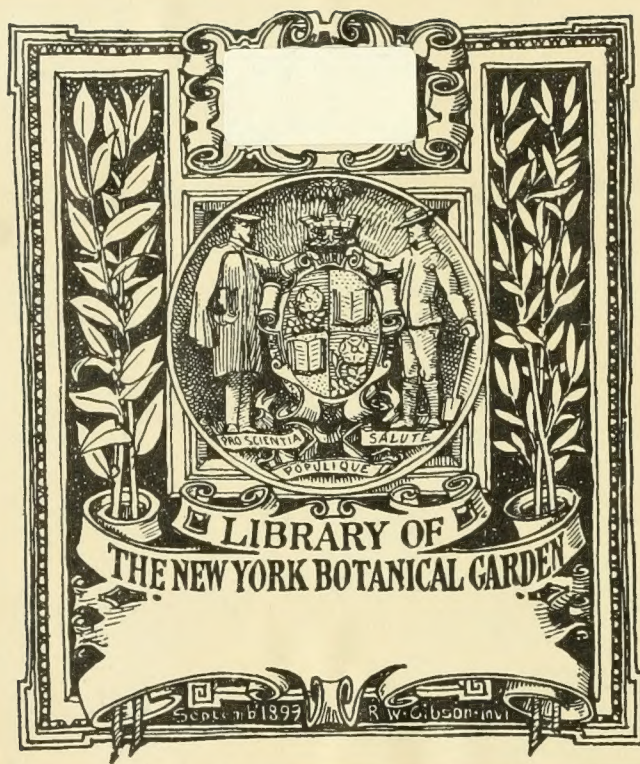


5827713
21



101

.M4

B72

125

Although the genus *Mesembryanthemum* contains several hundred species, many of which have showy flowers, it does not seem to find much favour with the horticulturists of the present day, for there are comparatively few who cultivate them, and they are not to be found in many gardens. Yet where they can be fully exposed to the sun they make a grand display of flowers, and require much less attention than many other plants.

The members of this genus undoubtedly merit more recognition and appreciation by the gardener than they usually get in this country, for none can deny the beauty of the flowers, their only fault being that they love sunshine, and many kinds will only expand their flowers when the sun shines upon them, others only at certain hours of the day, and others at night. Mostly they are cultivated under glass, but they thrive best when exposed as much as possible to air and sunshine.

It may not, perhaps, be generally known that in the south of England and Wales, and even on the cliffs of the east coast at Bawdsey Manor, near Felixstowe, I am informed by Mr. Irving that many species are grown in the open air and are quite hardy, for they withstand the average winter, and flower in great profusion in the summer, making a grand display in such places. Whilst admiring a fine clump of *M. falciforme* growing out-of-doors in this way at Tenby, and so densely covered with flowers that they touched one another so as to nearly conceal the plant, I

126

was told by the lady who owned it that, although it flowered in this profuse way when treated as a hardy plant, yet when grown in her greenhouse, it produced only a few flowers, thus demonstrating the preference of these plants for open-air treatment.

Among those that I think could be grown in the open air successfully, especially near the coast, or treated as bedding plants, are *M. falciforme*, *M. falcatum*, *M. hispidum*, *M. coccineum*, *M. Brownii* (which is probably a garden hybrid), *M. luteum*, *M. aureum*, *M. polyanthum*, *M. multiflorum*, *M. deltoides*, *M. Haworthii*, *M. heteropetalum*, and *M. multiradiatum* (syn. *M. blandum*).

Unless the season were unusually wet and cold, I believe most, if not all, of these would thrive and make a good display if thus treated, but they would require to be grown in porous well-drained soil. Fig. 48 illustrates the kind of display these plants make under favourable conditions. It represents a clump of *M. lineare*, Thunb. (better known as *M. tricolor* and *M. pyropeum*), a very pretty annual, with linear channelled leaves, and Daisy-like flowers that vary in colour being white or purple, or purple with a white eye. Yet all cannot be grown in this manner, many being impatient of too much water or great humidity of the air when they require to rest, but during the warmer part of the year, if they could be placed in the open air, fully exposed to the sun, and protected by a glass roof (without sides) to shelter them from rain, and carefully watered, I believe all the species would thrive much better than they do as grown in a greenhouse.

During a lengthy experience in the cultivation of the stemless species of this genus, I have found it preferable to water these plants either by standing the pots containing them in a shallow tray of water and allow the water to soak upwards, or by plunging the pots in earth and keeping that earth damp, without watering on the top of the soil in which the plant is growing, although during

126 hot weather the latter method answers very well and does no harm, provided that it is not overdone, and at the same time sufficient water is given to soak down to the region of the root-tips. For, if the latter are allowed to get too dry, so that they die, then when water does reach them they rot and often cause the death of the plants. The watering of the more delicate species is an art that cannot be explained by words, and can only be acquired by experience.

This genus, as at present understood, is so vast and contains so many species that are undescribed, although already under cultivation, besides a large number that I am certain yet remain to be discovered, that the monographs of the present day are quite useless for distinguishing closely allied species, for many are so similar in general appearance that, when seen separately, two species are liable to be (and often are) mistakenly supposed to be identical. So that names under which some of these plants are found in gardens are often entirely wrong. As an instance I may cite a plant cultivated in gardens and also described in Berger's monograph of this genus as being *M. carinans*. It is not that plant, however, but a smaller species allied to it, which I last year described in the Journal of the Linnean Society, Vol. XLV, p. 66, under the name of *M. granulatum*. Sometimes, also, synonyms are manufactured by nurserymen, especially those on the Continent, who seem only concerned in the selling of their plants, without taking the trouble of identifying them. As an instance of this, *M. concinnum* (Fig. 49) may be quoted. This is one of the prettiest and neatest of the stemless group that I have seen, and forms an excellent contrast to its equally charming ally, *M. calcareum*. It has a rosette of short, blunt, somewhat clavate leaves, beautifully marked with slightly raised, white, wart-like spots. It was described by myself in the Gard. Chron. for 1916, Vol. LX, p. 204, from a plant formerly in the collection of Mr. G. Elisha and now in my possession, of which Fig. 49 is a life-size representation that, unfortunately, does not give a good idea of the beauty of the plant, colour being absent. Afterwards I learnt that it had been figured by Dinter in his *Neue und wenig bekante Pflanzen Deutsch Sudwest Africa*, p. 38, f. 56 (1914), as being *M. calcareum*, from which it is very distinct; and now it is being sold by Continental nurserymen under the name of *M. Schwantesii*. From some cause quite unknown to me, I find that during some years the coloration of the leaves is much brighter and more pleasing than in others. Possibly a difference of sunlight may produce this effect. *M. calcareum* also varies, but with me its leaves are usually of a beautiful purplish tint. This confusion of names is not to be wondered at in the present state of our knowledge, and only when the undiscovered species of this genus have nearly been exhausted, and a really workable monograph of it made, can we hope to remedy it.

N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 70: 138. 1921.

(Continued from page 126.)

138

Whilst writing this, I have in flower two distinct species from the Transvaal, so much alike in foliage that, if seen separately in different collections, when out of flower, would

138 almost certainly be mistakenly thought to belong to the same species, and, moreover, I feel sure that South African botanists have mistaken one or the other of them for the Rhodesian *M. Mahoni*, because Dr. Marloth has stated in his Flora of South Africa, Vol. 1, p. 198, that the latter is a Transvaal plant. One of these transvaal plants is *M. herbarum*, which I described and figured in the Journal of the Linnean Society Vol. XLV, p. 108, t. 10, f. 43, and of which Fig. 55 is from a photograph, and of about half natural size, taken by my daughter from my type plant. The other is *M. macellum*, a new species described below,* of which Fig. 56 is also

* *Mesembryanthemum macellum*, N. E. Brown. Rootstock, a fleshy cylindric tuber about 1½-2 in. long and 4-5 lines thick, with brown skin, producing a cluster of stems at its apex. Stems 2½-3 in. long, ½-¾ line thick, slender, weak and often bending down with the weight of the capsule, terete, glabrous but minutely papillate, with the papillae arranged in crowded irregular transverse bands or lines. Leaves ½-1 in long, 1¼-1½ lines broad, and about 1 line thick, more or less spreading and scarcely connate at the base, sessile, tapering to an acute apex and channelled down the upper surface, glabrous, densely and minutely papillate in crowded longitudinal rows, dull greyish-green. Flowers about 1-3 to a stem, distant, developing singly, without other flower-buds apparent on the same stem. Pedicels 7-20 lines long, erect, papillate like the stem, bractless. Calyx 5-lobed; tube (ovary) sub-hemispherical; lobes unequal, two of them 2½-4 lines long, leaf-like, without membranous margins, the others 1½-2 lines long, and broader than the other two, with membranous margins and a short dorsal acute point, all dull green and papillate like the leaves. Corolla 7½-10 lines in diameter, rather flat expanding in sunshine, not scented; petals about 28-36, in 1-2 series, most of them rather crowded and more or less overlapping, widely spreading from the base, 3-4½ lines long, ½-¾ line broad, cuneately linear, flat, obtuse, entire, with 5-10 smaller linear or filiform petals 1½-2 lines long, irregularly placed inside the outer series; all uniformly bright deep rosy-purple. Stamens numerous, erect, becoming lax with age, about 1 line long, scarcely or not at all raised above the general level of the corolla; filaments filiform, with a tuft of hairs at their base, whitish, the outer without anthers and reddish; anthers deep yellow. Style, none; stigma 5, arising from the flat top of the ovary, ¾-line long, stout, tapering to a fine point, all erect and connivent into a cone, never spreading, pale greenish-yellow. Capsule about 3 lines in diameter, flat-topped, 5-valved; valves winged at their margins and with one central expanding keel, entirely whitish; cells entirely wingless, with the seeds uncovered. A native of the Transvaal. Described from living plants collected by Mr. T. M. Leslie and sent to England in February, 1921.

from a photograph of my type plant, about one-third natural size. These two plants and *M. Mahoni* (described by me in the Gard. Chron., 1892, Vol. XXXII, p. 190) are so very similar in appearance when out of flower as to easily be mistaken for one another when seen separately, that the following diagnostic characters may prove useful for distinguishing them. All three have their somewhat

138 greyish-green leaves densely covered with minute, dull papillae.

Stems 1-1½ lines thick; flowers in more or less compact cymes, quickly succeeding one another, each with a flower bud formed on one or both sides of it before the flower fades; petals lax, not touching one another; stigmas always spreading.

Pedicels 4-6 lines long; petals entirely bright violet-purple. Rhodesia.

M. Mahoni

Pedicels 1-3 lines long; petals white, or white with pale purple tips. Transvaal.

M. herbeum.

Stems ½-¾ line thick; flowers solitary at distant intervals, not forming distinct cymes, nor with a flower bud forming beside each flower while the flower is open.

Pedicels 8-20 lines long; petals touching or overlapping one another, bright rosy-purple; stigmas collected into an erect cone, never spreading.

M. macellum.

M. macellum is evidently self-fertilised, as each of my three plants of this species has expanded its first flower (the only one then on my plants) at a time when no other plant of any species of the genus had a single flower (even in bud) upon it, yet that flower in each case produced and ripened a capsule containing good seed, that has germinated, and since then I have several times had each of these plants in flower separately, so that they had no chance of being pollinated by each others' pollen, yet all the flowers seem to be fertile. On the other hand, *M. Mahoni* and *M. herbeum* seem to require to be cross-fertilised, otherwise neither produce capsules, and the flowers of *M. Mahoni* often fall off the pedicels, leaving the latter to wither and harden. I have not observed this falling of the flower from the pedicel to be the case either in *M. herbeum* or *M. macellum*.

The three above species form a little group that appears to me to be best placed under the section *Digitiflora*, but seem also to have connection with such species as *M. hirtum* and *M. Cooperi*.

From the gardener's point of view, the merits of the genus *Mesembryanthemum* rest upon the attractiveness of its flowers. Yet, apart from their floral merits, there are many species that have hitherto been included in the genus *Mesembryanthemum* that appeal strongly to those who are interested in plant life, on account of marked regularities they have in appearance, habit, mode of growth, or structure. For it is not generally known that this genus, as at present constituted, contains some of the most remarkable plants that exist. Certain of them well deserve a place in the collections of those who have a liking for curiosities of the plant world, for, besides being remarkable, some of them produce very charming flowers. It is to some of these extraordinary plants that I wish to direct attention, because I think the time has now come when they should be generically separated from *Mesembryanthemum*.

N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 70: 151. 1921.

(Continued from page 138.)

151

In 1821, just 100 years ago, Adrian Haworth published his *Revisiones Plantarum Succulentarum*, and described therein 310

151 species of *Mesembryanthemum*, which he grouped under 69 different sections. Some of these sections are so utterly different in appearance from others in their vegetative characters that many would not recognise them as belonging to the same genus. Yet not only are the vegetative characters of many different groups found to merge into one another through intermediate groups, when a sufficient number of species are studied, but the floral characters are very similar or practically identical in utterly dissimilar groups, so that it has hitherto been found impracticable to separate the groups generically by any absolute characters.

This was evidently the experience of Haworth, who was the first to properly monograph this genus, for on p. 79-80 of the work above mentioned he writes, concerning the groups he has characterised, as follows:-- "It is to be believed that the above numerous and natural groups comprise amongst them several true and natural genera. Nevertheless their actual limits and essential characteristics (except in *M. glabrum* hereunder detached) lie veiled in difficulties which (thus far, at least) escape development and defy research; they will not be fettered. And yet the author once had vainly hoped that the *Linum*, from the tubular corolla of some of them; the *Linguiformia*, from their quadrifid calyces and multilocular capsules; the *Articulata*, from their hard coloured internal petaloid fimbriellae (and their small number of abbreviated true filaments), keeping open continually their lovely flowers; the *Uccocorhala* and the *Terfoliata*, etc., etc., might each have constituted a distinct genus (and they probably are such). But he has hitherto been so effectively foiled by such insensible shades and intermediate gradations of character amongst species even of the same section (the *Minima* not excepted) that he has not yet been able to reconcile their discrepancies."

For many years past I have cultivated and studied the groups to which Haworth gave the sectional name of *Minima*, now known as the sectional name of *Minima*, now known as the *Sphaeroid* group, and also others allied to that group, very many of them quite unknown to Haworth. In the course of that study I have noted characters associated with their odd appearance not shared by other groups. So that by taking their habit, peculiar mode of growth, floral characters, and certain vegetative peculiarities into consideration, we now have sufficient distinctive characters to separate them generically from *Mesembryanthemum*, as I here propose to do.

But before dealing with them systematically it may be of interest if I give particulars concerning this genus as a whole that are not known to the average plant-lover. Some of the details to be mentioned, however, were published last year in the *Journal of the Linnean Society*.

Starting work with the seed-vessel, we find that *Mesembryanthemum* has capsules of more complicated structure than any other genus, some of them being of such a remarkable character that at first sight they would seem to be specially designed to prevent the seed from escaping. The structure of the capsules, dispersal of the seeds, and the development of the seedlings of this perfectly unique genus form a most interesting study, so that it is surprising that no one appears to have paid any particular attention to the peculiarities of structure of the capsules of *Mesembryanthemum* and the mode of its seed-dispersal. In descriptions of the species the capsule is practically ignored, the only detail mentioned being the number of its valves. Yet from the large number of capsules I have

151 examined during the last two years, belonging to several sections of the genus, it is evident that the structure of the capsule when seen in an expanded condition often affords excellent characters for specific distinction. Therefore, the following brief account may be of some interest and bring to the notice of South African students what a field for research they have in this extraordinary genus, which for several decades past seems to have been almost entirely tabooed, perhaps because they are "succulent plants."

The capsules of all the species of *Mesembryanthemum* open by valves, which vary from four to twenty or more, according to the species, and are well known to be very hygrometric, so that the valves automatically open during wet weather and shut up tightly during dry weather. When fully expanded the capsule has a very pretty star-like or flower-like appearance, and it is often differently coloured at different parts, and is then quite attractive. This property of opening when wetted and closing as they dry, and their prettiness, has caused them to be occasionally sold in London as the "Rose of Jericho," a name that belongs of right to one of the Compositae from the Orient, but is also shared by a Cruciferous plant, also from the Orient, and one occasionally from Mexico. Fig. 61 represents the capsules of eight different species when closed in dry weather, exactly as they would be when viewed from above upon the plant. They are always stiffly erect or in those that lie upon the ground the valves are directed upwards, so that when closed in this manner no amount of shaking by the wind or other disturbance can possibly cause the seed to be liberated from the capsule.

Fig. 61.-- Capsules of *Mesembryanthemum*: (A) *M. Heathii*; (B) *M. vilosulum*; (C) *M. Shandii*; (D) *M. longum* (?); (E) *M. pomariiflorum*; (F) *M. sp.*; (G) a new species of the sub-eroid group; (H) *M. species allied to M. heathii*. All natural size.

Fig. 62.-- The same capsules as in Fig. 61 when expanded by wetting; Natural size.

Fig. 62 represents (after removing the six-valved capsule from A) the same eight capsules as they appear when fully expanded after being wetted, and as they would appear upon the plant after rain has fallen upon them. A few hours after the rain has ceased they dry up and the valves close up tightly again until the next fall of rain comes. This opening and closing may be repeated several times, as the capsules remain on the plant of perennial species for months or for two or more years. It is during the time that the capsule is expanded that the seeds escape from it or are dispersed, yet how this is effected in some cases I am unable to state, for as far as known to me it is at present an unsolved problem. In other cases, however, the method is simple, as will appear when the structure is understood. Certain it is, however, that the seeds require to be dispersed during wet weather in order to give them a chance to germinate and grow, which they could not do during dry weather.

If a capsule of the very complicated type represented by D in Fig. 62 be examined when expanded, it will be noted that upon the inner surface of each valve or lobe there are two keels ending in free membranous wings (marked a). In this specimen the wings had

151 dried and curled up whilst being photographed, but can be seen on one of the lower lobes, and similar wings are better seen on the specimens A, B, G, H (Fig. 62). These keels are frequently of a darker colour than the rest of the capsule, and consist of a horny water-absorbing tissue that forms the mechanism by which the valves are opened and closed. As no designating term has yet been applied to them they may be called expanding keels. In some species, as in D, the keels are quite separate, in others, as in A, B, C, E, they are closely contiguous or united at their basal part and more or less separate or divergent at the apical part, or occasionally are fused into a single central keel. Sometimes the expanding keels are entirely without wings or awns, but more often they are winged at the upper part on their outer margin or are tipped with an awn, or are both winged and awned. In some species the wings appear to arise from the inner surface of the valve, as in F, where they are infolded and do not appear very clearly in the figure,

152 but under two of them a seed has become lodged, each represented in the figure by a black spot. The central part of the capsule is occupied by the cells containing the seeds. The cells are of the same number as the lobes and alternate with the latter. Usually they are completely covered or roofed over by two wings (marked b), which arise from the partitions separating the cells. These may be termed cell-wings, although often semi-transparent, are of a somewhat horny nature and slightly stiff; in others they are more membranous and more flexible, as in A, B, C, G, H. Their inner edges are usually closely contiguous or overlap, and their outer margins either leave a small gap between them and the outer boundary of each cell, as in all the figures except D, E, F; or the gap is nearly filled by a hard boss as at c (D) in Fig. 62; or they are somewhat pinched together as at the place marked d in E, fig. 62. But in a comparatively small number of species the cell-wings are entirely absent, as in F, or are very rudimentary so that the seeds are entirely uncovered.

N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 70: 172. 1921.

(Continued from page 152.)

172 When the dispersion of the seeds of Mesembryanthemum is investigated, we find it stated in books that they are washed out by the rain, and this is the only information given concerning their dispersal. In the case of the F type of capsule (see Figs. 61, 62, p. 151) it is obvious that the seeds after the expansion of the lobes, would either be washed out of the capsule by the rain, or, after the rain has ceased and whilst the capsule is drying up and closing, might be shaken or blown out by wind. But in the case of such extraordinarily complicated structures of the types D and E, this explanation is anything but convincing or satisfactory, for although it is evident that rain has something to do with the release of the seeds from the capsules, I have as yet quite failed to discover how this is effected. For in the D type the entrance to the cells containing seeds is so nearly blocked up by the boss (c) that there is only quite a narrow space left between the boss and the cell-wings and the sides of the cells, which is not wide enough to permit the seeds to pass through it without force being used. And the wings that cover the cell like a roof, are, in this type, rather to separate their contiguous

172 margins. The cell-wings are also stiff in type E, and although the closing boss is absent the cell-wings are so arranged that the opening they leave between them at the outer side of the cell is too narrow for the seeds to pass through without force being used, as may easily be ascertained by experimenting with a needle and trying to push them through the opening either from within or without the cell.

Now it is certain that this complicated structure is somehow arranged for the dispersal of the seeds. Nature does not waste her energy for nothing. It is also certain that the seeds do get out of these complicated structures, as I have found old capsules often to be quite empty. The capsules remain upon the plant often for two, three or more years, and open and close with every fall of rain, and it is only at that time the seeds are released. But how? During one of our wet summers I raised some ripe capsules of the D type over a pan and placed them in the garden, where they remained for many days fully exposed to rain and wind. The result was that I found fewer seeds washed out of the capsules into the pan than there were capsules, an average of less than one seed per capsule. This does not accord with what I think must take place when the capsule is on the plant in South Africa. Also I should explain that I have only experimented with capsules belonging to

173 species, in which the capsule would not be raised more than from half-an-inch to four inches above the ground, so that shaking by wind would not have much effect in dispersing them.

I have noticed, however, that often when capsules of different types have been re-expanded by wetting after a previous expansion, a few (one to six) seeds may fall out of them into the saucer or basin in which I have placed them. So that it is possible that at each opening of the capsule only a few seeds are liberated at a time, the chance of their being able to germinate and obtain sufficient moisture to grow to a size that would enable them to withstand the dry season, being a varying one; for if all the seeds were shed at once and the subsequent rainfall insufficient to enable the seedlings to establish themselves, the efforts of the plant would be wasted for that year. In the case of the type of capsule A, B, C, where the cell-wings are thin and membranous, the liberation of the seeds seems to be effected by the rain beating upon the roofing cell-wings so as to cause them to flap upon the seeds and displace them from their stalks so that they can afterwards be washed out of the capsule. But even in this type I do not find that all the seeds in a capsule are washed out at once in the experiments I have made. It would be interesting if some South African botanist, having the opportunity, would observe and give an account of what takes place under natural conditions with the various types of capsule.

In the extract I have made from Haworth's book he mentions the capsule as possibly forming a character by which the sections of this genus might be separated to form new genera. This may be the case in some instances, yet as I find the same type of capsule is sometimes found in two totally different sections, and two types of capsule sometimes found in the very same section, the character of the capsule does not seem to be a reliable or a promising one for distinguishing genera or sections. For example, G in Figs. 61, 62 represents the capsules of one of the stemless Sphaeroid group, and they possess distinct well-developed cell-wings, whilst the capsule of another species of the same group (*M. piluliforme*) is quite destitute of cell-wings, and in this character quite agrees

175 with the capsule of a tall shrubby unnamed species that I have examined, which also has a bell-shaped fruit. I should also note that the position of the placenta varies, being sometimes confined to the central axis, at others more or less on the outer wall of the cell.

The study of the germination of the seeds and subsequent development of the seedlings of various species of this genus is a most interesting and fascinating one to the biologist, and will, I believe, provide better and more complete evidence of evolution than can be found in any other genus of plants. In the animal kingdom the evolution of different groups from one another can be partly traced by the development of the embryo, and among plants I do not know of any genus or group of genera in which the evolution of one group of species from another and very dissimilar group can be so well shown as by the study of the development of seedlings of various species of different sections of *Mesembryanthemum*.

N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 70: 207. 1921.

(Continued from page 173.)

207 Having raised from seeds sent to me from La Martole and by several South African botanists and friends numerous species belonging to many widely different sections of the genus, I find that so far as my observations have yet extended, when the seedlings have developed their cotyledons to the fullest extent (for they continue to grow until just before the first pair of true leaves appear), or rather when they have produced the first pair of leaves, the seedlings can readily be grouped under three distinct types, as follows:--

I. In this type the cotyledons resemble those of most dicotyledonous seedlings, spreading widely, and are rather thin or thickened beneath, so that viewed sideways they form a very short and broad obconic body. From between them arises a pair of distinct leaves that are quite different in shape and appearance from the cotyledons, as are also the leaves of the adult plants, which usually produce more than one pair annually. This type is represented by Fig. 84, A-F, and to it belong the majority of the known species of *Mesembryanthemum*.

II. In this type the two cotyledons are combined into a half-globose body slightly depressed across the flattened top. From this body arises a pair of half-globose distinct leaves, quite unlike the cotyledonary body in appearance, as are also the subsequent leaves made by the plant of which normally only a pair is produced each year. This type is represented by Fig. 84 G-H.

III. The cotyledons of this type are the same as in type II., but the new growth that succeeds them and all subsequent growths of the plant consist of a single ovoid body with a tiny orifice like a closed mouth at its apex, and is quite unlike the cotyledonary body. Fig. 84, I-L represents this curious type, which is intermediate between types II. and III. When in the stage shown by C, the seedling has much resemblance to an acorn in its cup, the acorn-like part being of a pale translucent green and finely tuberculate; viewed under a lens it is really quite attractive. The adult plant is represented of natural size of K, from a rough sketch I made of a

207 plant sent to me by Dr. L. Berloth, upon which was one dead flower. The stigmas are as shown at L. This plant (*M. oviforme*, L.E.Br.) is an anomalous one, the mode of growth is as in type IV., but the cotyledons have little resemblance to the growths of the adult plant, and the stigmas arise directly from the top of the ovary, without a style.

IV. In this type the cotyledonary body and the growth that succeeds it (consisting of a single body resembling the cotyledonary body) and the growths of the adult plant, differ but slightly in general appearance, except as to size. Fig 84, M-R represent this type, whose peculiar mode of growth will be explained hereafter; to it belong the species constituting what is known as the Seneciooid group.

Possibly there may be other types, but I have not yet seen them.

Fig. 84. A, B--*M. longum*; C, D--*M. calamiforme*; E, F--*M. dolabriforme*; G, H--*M. testiculare*; of each of the above a fully-grown seedling in the cotyledonary stage, and when it is producing its first pair of leaves, is represented. I, L--*M. oviforme*; I, the cotyledonary stage, and J, the same when producing its first growth, enlarged four diameters; K, an adult plant, natural size, and L, the stigmas, enlarged. M, O--*M. piluiforme*. P, R--*M. pseudotruncatellum*. N and Q represent seedlings one day old, enlarged; N and Q the same seedlings in the full-grown cotyledonary stage, just before the skin dries up, natural size; C is an adult seedling, natural size; R, a young plant after it has cast the skin of the cotyledons, natural size.

We thus have in the different manner of development of the seedlings an indication of a difference of generic importance, which in some cases is combined with structural differences in the flowers that are easily seen, so as to render the generic separation of some of these plants from *Mesembryanthemum* not only warrantable, but desirable, on account of the unwieldy size of that genus.

Turning now to their vegetative characteristics and mode of flowering we find among these plants one of the most extraordinary that exist, for they are absolutely unique, there being nothing else like them in the vegetable kingdom. The shrubby species and those with prostrate stems usually develop more than two or three pairs of distinct leaves annually, and there is nothing remarkable about their mode of growth. But the longely tufted or stemless species seldom develop more than 2-3 pairs annually and also are not remarkable. In the curious group to which *M. rostratum*, *M. bifidum*, *M. vescum*, etc., belong, each vegetative growth develops two dissimilar pairs annually; one pair being united for a greater length at the base than the other pair which protrudes from the sheath thus formed by the first pair. Sometimes also the alternating pairs are dissimilar in shape, one pair being toothed on the back at the apex and the alternating pair without teeth. Most of this group have their leaves of a very glaucous-green or even whitish colour and usually plentifully dotted. This whitish or glaucous appearance is common to many kinds of *Mesembryanthemum* and is not caused by a waxy deposit or "bloom" on the surface that will rub off, but by a deposit of lime crystals in the substance of the outer wall of the epidermal cells, which act as a screen to protect the chlorophyll from being injured by intense light. Under cultiva-

207 tion in this country during winter, light being less intense, the lime crystals are more or less dissolved and the plant becomes much greener in colour, but with the advent of spring the crystals are deposited again and the light-screen being denser, the plant gradually resumes its whiter appearance. I have never seen any species of this group in flower; they commence to grow in autumn and I think want to flower in winter, when sunlight and heat are insufficient.

N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 70: 223. 1921.

(Continued from page 207.)

223 Some species like *M. lavidiforme*, *M. Bolusii*, *M. simulans* (Fig. 94) and a few others, normally develop only one pair of leaves annually, but while the new pair is forming the old pair remains plump, and so two pairs are seen on the same growth at that time, the old pair afterwards shrivelling (during our spring) and disappearing. When, however, more than one pair persists throughout the summer, it is due to bad cultivation in the shape of overwatering, possibly resulting in the plant not flowering that year. The flowers of *M. simulans* are very handsome, two inches or more in diameter, and usually bright yellow in colour, but seedlings of it have been raised by Dr. Rodier Heath that have pure white flowers, and another with orange flowers, which are very charming by contrast; all varieties are strongly and deliciously scented, the odour being something like that of a freshly-opened coconut. The flowers of *M. Bolusii* are very similar to those of *M. simulans*, but the petals are fewer and not in so many series and lack the more graceful pose that the latter have.

These species, however, do not show any marked peculiarity of growth different from that of other plants, but if the mode of growth is examined of the remarkable little group to which *M. nitratum*, *M. proximum* and allies belong, it will be found to be quite different from that of all ordinary plants. Fig. 95, A, represents a growth of *M. proximum* in June, when its growth seems to be finished and the apparent resting period begun. It remains in this condition until late in September or beginning of October or even later, apparently without any other change than that the two leaves at the top of the solid-looking cone wither and shrivel to very small remains. This cone consists of two leaves fused into a solid body for the greater part of their length with only their tips free. Inside the cone at the bottom, in the centre, is a bud, which, while the plant appears to be at rest, develops inside the cone into two leaves that are free to their base. Their development is quite undetectable and unsuspected from the outside and they grow at the expense of the substance of the cone, which is finally completely absorbed and replaced by the new leaves inside it, so that only the skin remains to cover and conceal them, which changes to a greyish colour. In autumn or early winter the skin is burst and the two free leaves inside it spread apart, bearing fragments of the old skin on their backs. No other leaves are apparent at first, but soon the second pair is seen protruding from between them. Fig. 95, B, represents the same growth in January of the following year, showing the expanded free leaves with fragments of the skin of the old cone adhering to their backs, and the formation of a young cone by the second pair of leaves, raised upon a short interval of stem. This young cone repeats the process

A similar remarkable mode of growth occurs in *M. pygmaeum*, and the peculiar and very charming *M. evolutum* (Fig. 96, from a photograph by Dr. Rodier Heath), whose beautiful purple flowers are three or four times the diameter of the tiny growths producing them, when resting shrivels its leaves to a white papery consistence completely concealing the young leaves under them. Both these latter plants have the appearance of being dead during the summer time, and cultivators who are unaware of their peculiar mode of growth would be apt to throw them away as dead or dying. In autumn, their period of growth commences and they assume a totally different appearance. I have never seen a cultivated specimen of *M. pygmaeum* in flower, and judging from the very few indications of flowers I have seen upon dried specimens, it would appear that it flowers very sparingly in wild state.

The scheeroid group have no free leaves, yet their mode of growth is somewhat similar to that of the cones of the *M. proximum* group and quite unlike that of any other plants. When describing the seedlings of this group (type IV., Fig. 84, M-R) I stated that the full-grown cotyledonary stage and the growths of the adult plant differed very little except in size. Their peculiar mode of growth explains how this is brought about. Fig. 97 represents one of these plants, which I am separating from *Mesembryanthemum* under the generic name of *Conophytum* (cone-shaped plants).

A, cotyledonary stage one week old; B, the same seedling just after it had cast off the skin of the cotyledons; C, a group of four adult growths; D, flowering growth in section, showing the flower arising from the bottom of the growth, with a minute bud at its base; E-G, sections showing the manner in which the bud inside the growth enlarges and gradually absorbs all the substance of the older growth until only its skin is left, which, after a rest, the new growth bursts and it is blown away by the wind. All natural size, except A.

A is a seedling one week old, in the cotyledonary stage, enlarged three diameters; B is the same seedling some months later just after it had cast off the dried-up skin of the cotyledons, natural size. From these figures it will be seen that B differs very little from A, except in size. This seedling developed inside the cotyledonary body in a quite invisible manner, just as is diagrammatically represented in the sectional views of adult full-sized growths at E, F, G; the young internal growth gradually absorbs the substance of the older growth until nothing is left but a dried and often wrinkled whitish or brown skin of paper-like consistence, covering and entirely concealing the new growth inside. In this condition the plant rests during the dry, hot weather, then, when rain falls, growth again takes place, the dried skin is burst asunder and cast off or blown away by the wind, and flowers are afterwards developed. Each of these obconical bodies or growths is in reality a branchlet of the plant terminated by two fleshy leaves fused into an obconical or globose mass, with a flattened tube passing from the small mouth-like orifice at the centre of the top through the centre of the mass to its base. At the bottom of this tube is a minute bud, which either develops into a flower that pushes its way up through the tube as represented at D, or into a vegetative growth as shown at E-G. If it develops into a flower, a vegetative bud is always formed on one or both

223 sides of the base of the flower-stalk inside the growth, as represented at D, which subsequently develops into a new growth.
H. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.
Gard. Chron. III. 70: 250. 1921.

(Continued from page 223.)

250 The small group of which *M. Lesliei* (Fig. 110) and *M. pseudotruncatellum* (why do the Germans devise such horrible names?) are typical representatives contains some of the most remarkable of all flowering plants, for they are not only "Mimicry-plants," but also belong to the very small group known as "Windowed-plants," which are all exclusively South African. In the seedling stage they are externally indistinguishable from the *Sphaeroids*, compare for example in Fig. 84 on p. 207 the seedling stage of *M. Lesliei* represented by Q, R, with the adult *Sphaeroid* represented by M-O; both have a central orifice; but at a later stage that orifice in *M. Lesliei* changes into a transverse fissure across the flattened or convex top of the plant, dividing it into two short contiguous or slightly gaping lobes. The mode of growth is just the same as that described for the *Sphaeroides*, but the flowers differ by having no tube.

As mimicry plants, few can beat them, for in colour they are brown, rust-coloured, grey, buff, reddish or whitish, with or without mottling on the top, so as to closely resemble the soil, stones and pebbles among which they grow, buried in the ground with their tops nearly or quite level with the surface of the soil. The first discovery of one of these curious plants was made by Burchell, who, when travelling in South Africa, at a place called Sand Vlei, far in the interior, on September 14, 1811, stooped to pick up what he thought was a rebble, but when he got it in his hand he found, to his astonishment, that he had picked up a living plant that very closely resembled the stones it was growing among. Burchell made a drawing of the plant, and from that drawing Haworth described the plant as *M. turbiniforme*, in 1821. Nothing more than this description was known of the plant for over 100 years after its discovery, as the drawing appears to have been lost or destroyed and I had tried in vain to get the plant refound, but the spot was too out of the way to be got at easily. Having asked Dr. I. B. Pole-Evans to look out for it if he had the opportunity, he being in the region in 1918, was fortunate enough to find that after searching a whole week for it-- a few specimens of the plant at or near the place where Burchell discovered it. Fig. 111 is a view of the plant as he found it growing, taken on the spot by Dr. Pole-Evans, who has kindly given me permission to make use of it, but reserving to himself the copyright. This view shows the plant growing among the stones near the centre of the picture and demonstrates how easily a person might walk over the ground where these plants grow without detecting their presence when out of flower. Indeed, Dr. Marloth and Mr. Burt Davy have both told me that they have walked for a long time over ground where *M. Lesliei* was known to grow without finding it, so closely does it resemble the rust-coloured soil and stones where it grows, as may be perceived from Fig. 110, copied from a photograph of *M. Lesliei* kindly sent to me by Mr. Leslie (its discoverer), which shows two growths that

250 have expanded their flowers and two others above them not in flower, of natural size viewed from above, showing the exact appearance of these plants as they grow in their own locality. From this figure it can easily be understood from the appearance of the two flowerless growths that the plant would not easily be detected when out of bloom. *M. pseudotruncatellum* and *M. marmoratum* are greyish and mottled on the top somewhat like the mottling often seen on stones, and as they grow among greyish stones and pebbles buried nearly level with the ground, are also very difficult to detect when out of flower. Yet under cultivation in this country it is better not to plant them buried in the soil as they grow naturally, because our climate is more humid than their own and there is risk of them rotting.

I have said that these plants also form part, and the greater part, of the very small number (less than 20 I believe) known as Windowed (not Window) plants. This is due to their remarkable structural peculiarities. It is usual to find that the green colouring matter (chlorophyll) of plants forms a layer over the surface of leaves and other green parts where exposed to light, but in these particular plants it does not, for the exposed surface shows no evidence of being green. Fig. 112, 1, represents a plant of *M. Lesliei* as it grows in the ground, natural size. Fig. 112, 2, is a sectional view of the same plant: A being the body of the plant, composed of clear, watery, colourless tissue, through which light can easily pass; B is a flower-bud at the bottom of the central tube through the plant, up which it pushes its way to the surface; C, C, are the layers of green chlorophyll, one layer covering the sides of the plant and most of it buried under the ground, and two narrow strips of it lining the mouth of the fissure, all the remainder of the top of the plant being quite destitute of green colouring matter; but externally, where exposed to the light, these layers are covered with a coloured pigment that acts as a screen and protects the green chlorophyll from being injured by the intense light of South Africa; D is the thin epidermis covering the top of the plant, which in *M. Lesliei* and most of the other species of this group is mottled or dotted. Under this part of the plant the chlorophyll layer is quite absent, and the epidermis serves exactly the same purpose as a window does, allowing light to pass downward into the interior under ground portion of the plant and thus reach the chlorophyll layer, E being the ground-level. This window is not transparent like clear glass but more nearly resembles semi-transparent glass than anything else, for the whole of the outer walls of the cells composing it have imbedded in them minute crystals of lime, which act as a screen and modify the intensity of light in the same way that frosted glass does. There are no crystals in the cells themselves, only in their outer cell walls. A portion of this epidermis magnified 130 diameters is represented in 3 (Fig. 112). The intensity of light is also further reduced by the top or window being coloured all over or mottled with a brown, rust-coloured, dull orange, grey or cream-coloured pigment; only in *M. opticum* and *M. Friedrichiae* is the window without pigment. *M. Lesliei* is mottled with dull orange or rust colour, and it is only where these coloured markings occur that stomata are found on the window part; all the spaces between the markings are destitute of stomata, which are very minute, and are plentiful on the underground sides of the plant and along the fissure where the chlorophyll layer is; two of them represented in Fig. 112 some distance from the margin,

250 where indicated by arrows. This somewhat elaborate arrangement of its structural details would seem to indicate that the chlorophyll of these plants is more sensitive to light or more liable to be injured by its intensity than that of their allies, which have not got this window-like structure. N. E. Brown
(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 70: 273. 1921.

(Continued from page 250.)

273 There is one other species of Mesembryanthemum, the curious *M. rhopalophyllum*, which, although having nothing in common with the *M. Lesliei* group, nor any resemblance to the, also belongs to the "Windowed plants," and the few others that are at present known belong to the order Liliaceae.

One of the most odd-looking groups placed under Mesembryanthemum is that to which *M. pubescens* and its allies belong. Of these plants very little is known in this country. They are dwarf tufted plants, whose growths are obliquely elongated, ovoid, or nearly cylindrical, and composed of two leaves very unequal in size, one being half or less than half as long as the other and combined with it into a single body, except a very short, free portion, which (except when a new growth is being formed) is so closely pressed against (or apparently into the side of) the larger leaf as to be only distinguishable by a mere crack. This gives to each growth the appearance of having an oblique, closed mouth on one side of it, so that the growths of these plants as nearly resemble a shark's head as I think it possible for any plant to do. This group is so distinct in appearance from all others placed under Mesembryanthemum that although I have not yet seen a flower of any species belonging to it, I feel sure that Haworth was right in considering it to be a distinct genus. I therefore adopt the generic name *Gibbaeum* he proposed for it in 1821 (*Revisiones Plantarum Succulentarum*, n. 104), which, like some other genera he proposed in the same book, has never been taken up nor even noticed by any author. The curious resemblance to a shark's head is well shown in fig. 181, which represents a new species of this group, *Gibbaeum argenteum*, described below,* of rather more than half

* *Gibbaeum argenteum*, N. E. Brown. Tufted, with numerous growths forming clumps up to 3 or 4 inches in diameter, and 1 to 1½ inch high. Growths about 1 inch long, and 5 to 6 lines thick, cylindric-ovoid, slightly bulging on one side at the lower part, narrowing upward to the slightly compressed, very obtuse apex, obscurely or scarcely keeled, with an oblique arched fissure 2 to 4 lines deep, and 4 to 5 lines broad, resembling a mouth a little below the middle, each growth thus somewhat resembling a shark's head, with the whole surface silvery-white (becoming greener under cultivation) from being densely covered with short, fine, appressed hairs, all pointing downwards. Flowers unknown. Fruiting pedicels, 1 to 2 inch long. Corolla 1 inch in diameter, 2-lipped, white. South Africa, Ladysmith Div., on stony ground, a few miles from Ladysmith, Pole Evans, 6932.

natural size, from a photograph taken by its discoverer, D. I. B.

273 Fole Evans, who has very kindly allowed me to make use of some of his photographs for illustrating this article on the condition that they remain his copyright.

This curious plant is covered with a silvery white pubescence of fine, short hairs all pointing downwards and closely pressed to the surface. When at rest the oblique mouth formed by the shorter leaf-tip is closed, but when the new growth develops, that leaf-tip separates from the larger leaf, thus resembling the lower jaw of a shark's mouth, and revealing the tip of the young growth inside, which, thus seen, somewhat resembles a tongue. The old growth does not appear to be absorbed by the new one in the same manner as it is by the sphaeroids, but withers and dries up after the new growth has grown out of it. I have never seen a flower of this group. Under cultivation, in the seedling stage, the growths of these plants are quite different from those of the adult plant, for the two leaves composing each growth are then about equal in length, and their free tips are not pressed together in the same way as they are in the adult plant. The successive pairs that are developed become more and more unequal, and finally, the adult form, as shown in Fig. 121, is assumed. This seems to indicate that these curious plants have evolved from some species with a pair of leaves of equal length. I understand that these white pubescent plants only grow where the surface of the ground is covered with white stones, so that at a distance they are not easily seen. Whether this is a case of what is known as protective mimicry I know not, but I have a suspicion that it may be. For the same kind of concealment from observation is adopted by the group of which *M. testiculare* is typical. These plants have only one pair (or, when making new growth, two pairs) of leaves, which are very firm in texture and covered with a very smooth, white skin, without dots or other markings, giving them a very distinct appearance from all others placed under this genus. When seen growing in a collection with other species they are very conspicuous from their smooth, white appearance, and I have been informed by Dr. R. Haroth, concerning *M. testiculare*, that "It is simply amazing to find this species only among the white quartz. I have several times walked on purpose several hundred yards towards a patch of such white quartz which I noticed from the road in order to test it, and the plant was there, flush with the gravel and white stones. Some of these patches are only a few yards in diameter, others a hundred yards long, and there may be half a mile or a mile of shaly or loamy ground in between without the plant. Why?"

As this plant will grow in loamy or other soil under cultivation, it would appear safe to assume that in some way its white colour protects it when growing among the white stones from the observation of ostriches or animals that would eat it, but that when its seeds fall and germinate (as they must surely sometimes do) upon the other kind of soil, they are easily detected and devoured.

Such species of this group as I have seen in flower have a circular, sessile stigma, quite different from that of all others, which, taken in conjunction with other character, warrant its separation from *Mesembryanthemum*. N. E. Brown

(To be continued.)

289 Turning now to the floral peculiarities, we find that there is such a general resemblance of the flowers to one another of different species of this genus that it would at first appear there is little to note. This similarity is, however, more apparent than real, and comparable with theaisy-like appearance of the flowers of many genera of Compositae that differ considerably in structure; for the flowers of Mesembryanthemum are also found to differ very considerably in structure when carefully examined. The calyx is sometimes produced into a tube above the ovary, sometimes lobed down to the top of the ovary, and the number of lobes sometimes vary in different groups. The petals are usually free nearly or quite to the base, but in the Sphaeroids are united into a distinct tube. Some German botanists consider the petals to be staminodes, and they have been described as such. But there is no more reason for calling the petals of Mesembryanthemum staminodes than for applying the same term to the petals of a Rose, Buttercup, Wallflower, or Tulip, for it is well known that stamens are convertible into petals as a flower becomes double, and in the Water Lily all stages from one to the other may be seen, as is sometimes the case in Mesembryanthemum. The stamens vary much in number and arrangement. In books the elongated stigmas are termed styles, but this is incorrect, as they are stigmatic to their base. The Sphaeroids have a distinct style, in other groups it is absent, the stigmas arising from the top of the ovary, and vary in form and character, and may be used for generic distinction.

In *M. lapidiforme* the flowers are really axillary, arising from the axils of the older leaves, one on each side of the new terminal
290 growth and remain dormant for some time before developing. But I think that in most if not all others the flowers are terminal, even though they do not appear to be so, as is not unfrequently the case. This is particularly well seen in the case of the group to which *M. linguiforme* belongs, where the flower arises from the second or third pair of leaves behind the terminal pair. In reality, I believe, the flower, when in bud, terminates the stem bearing that pair of leaves, but remains dormant, while a bud in the axil of one of those leaves develops one or two pairs of leaves; after these leaves are developed and the flower-bud pushes its way out from the leaf-sheath and develops.

A peculiarity about the flowers of many species that I do not remember to have seen mentioned in books is that they increase in size daily for a few days after their first expansion, sometimes attaining nearly twice the diameter they had on the first day.

Another point of interest is that they are excellent time-keepers, for, provided the temperature is sufficient, many species open and close their flowers at certain periods of the day with great regularity. For example, *M. simulans* begins to open its lovely flowers with me at about 4.30 p.m. and closes them at about 6.30 p.m., Greenwich time. I have a new species of which I have as yet seen only one flower, which did not attempt to expand until about 9 p.m., and several sphaeroids do not expand their flowers until after 5 p.m.

Colour of the flower does not seem to be of specific value,

290 although it has long been considered to be so in the case of the yellow-flowered *M. edule* and the purple-flowered *M. aequilaterale*, which are otherwise identical, but from a careful examination of the two plants growing side by side in Cornwall, where they have become naturalised, and from information received from South Africa, I am convinced that these two supposed species are but colour variations of one species. A proof of this colour variation is afforded in the case of *M. testiculare*. A few years ago I sent to Dr. Rodier Heath a single seed-pod of *M. testiculare* and the plants he raised from it are now coming to flower, and he writes to inform me that some are of a very pale whitish-yellow, others of a much darker yellow, and others purple. All these varieties being obtained from the same seed-pod demonstrates clearly that colour alone is not a specific character. Dr. Rodier Heath has also raised seedlings of *M. simulans*, some with white, others with orange or yellow flowers. The most curious case of colour variation that has yet come under my notice is that of the plant I described as *M. fraternum* some years ago. A single plant of it, of which I had a portion, was sent to Kew. The first year after it was introduced it flowered and was figured; the flowers were of a rosy pink. The same plant has flowered several times since, and each time the flowers have been white; it has not since produced a pink flower. At the same time was also introduced a single plant from another locality of what I consider to be a white-flowered variety of *M. fraternum* which has remained white and shown no tendency to vary, and is always of a slightly larger size and less glaucous than the type.

The only other peculiarity of which I wish to direct the attention of the plant-student and horticulturist alike, since it is closely connected with the cultivation of the Sphaeroid group, is that these curious plants have very short roots, rarely more than 1 to 1½ inch in length. Yet these plants thrive best in the driest and hottest parts of South Africa, some of them in places where the rainfall is only from three to six inches per annum. For months at a time the soil is thoroughly dry and parched. How do they exist under these conditions? They certainly do not thrive in this country if kept dry too long. This, however, may be due to the fact that they want to grow and flower during our autumn, which corresponds to spring in the parts of South Africa where these Sphaeroids grow.

N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 70: 303. 1921.

(Continued from page 290.)

703 I had one species sent to me in 1919, which began to grow well enough, but after a short time decayed. This spring the same plant was sent to me with the information that it grew upon flat rocks in about half an inch of soil. How does it exist under that condition? A plant growing in an inch of soil upon one of our pavements this year would have had a poor chance of surviving, I think, yet this plant thrives in a similar position in the drier and hotter climate of South Africa. But I found that this species would not submit to be dried up during this summer as its allies did, for again the plant began to die, and I have had considerable trouble to save it. Its behaviour probably indicates that it does not like the reversal of the seasons, and that, having passed safe-



303 ly through a South African summer was not prepared to endure an English summer in addition without first replenishing its store of food.

I have now given details concerning the vegetative and other characteristics of some of the very remarkable plants at present placed under the genus *Mesembryanthemum*, in order to explain and justify my reason for separating some of them from that genus and raising them to the rank of distinct genera. For the more I study *Mesembryanthemum* the more do I become convinced that, as at present constituted, it is rather of the nature of a natural order than of a single genus. The great difference in the vegetative characters of various groups as above described, is evident to everyone when the plants are seen together in a collection. It is the general similarity of the flowers of various groups that has caused them to be united into one genus. Yet this similarity, as I have previously stated, is often more apparent than real, for when the structure is carefully examined small distinctive characters may often be found, in fact, I think we may liken *Mesembryanthemum* to such orders as *Cruciferae*, *Geraniellaceae* and *Cubelliferae*, where there is often little evident difference to be found in the appearance of the flowers of different genera of those orders, therefore small structural differences in the flower are combined with other characters for separating those plants into genera. I propose to do the same with some of the groups at present placed under *Mesembryanthemum*, dealing only with the few groups I have cultivated, as the total number is too vast for me to attempt to classify without a prolonged study of all the groups in a living state, for the whole genus requires thorough revision, and that revision, I think, could be better done in South Africa than here, provided that the nomenclature be first carefully corrected by a competent person from a comparison of the plants with the drawings at Kew of Haworth's type plants; the nomenclature in the monographs of Salm Dyck, Berger, and the *Flora Capensis* is by no means trustworthy in many instances.

It may be asked, what characters are to be taken to distinguish the plants that are to remain under *Mesembryanthemum*? Linne evidently included several distinct types under that genus. Taking his generic characters in combination with the species placed in the genus by him, it would seem that the only definite characters that can be found are that the plants should have: (1) on each branch or growth two or more pairs of distinct leaves, connate only at their base; (2) a "monophyllous half five-lobed" calyx, by which I understand him to mean that the calyx is lobed down to the top of the ovary and not produced into a tube above the ovary; (3) a corolla with the claws of the petals but slightly united at the base, i.e., free nearly to the base, not united into a distinct tube; and (4) stigmas 4-5, subulate, erectly recurved. Linne and others describe the stigmas as styles, but I think that none of the species known to Linne have a true style, as the so-called styles of all his species are stigmatic all along to their base.

Which of the species best correspond to those characters is the problem that has to be solved, and when the genus is revised it will become a question whether plants differing so much in habit and appearance from the well-known "Ice plant" (*M. crystallinum*) or from such shrubby species as *M. coccineum* and *M. inclaudentis*, as do the two new species here figured, *M. Orpenii*

* *Mesembryanthemum Ornenii*, N. E. Brown. Plant tufted, about 1½ inch high, including the flower. Leaves in about four pairs to a growth, crowded, ascending-spreading, 6-10 lines long, 2½-4½ lines broad and 3-4½ lines thick, flat above, keeled down the back, being convex at the basal part and compressed at the apex, acute, with a minute point at the apex, glabrous, smooth, purplish or glaucous-green, with red ferruginous feel at the apical part, and thickly dotted with dark green. Peduncle 1-flowered, 4-5 lines long, 1 1/3 line thick, terete, glabrous, reddish-tinted. Calyx 3-lobed to the top of the ovary; lobes subequal, 5-4½ lines long, 2-3 lines broad, ovate, obtuse or subacute, and the two outer with a short dorsal point, 2-3 of them with membranous margins, glabrous, rather dull dark green or purplish-tinted and dotted with darker green. Corolla 1½ inch or more in diameter, expanding about 3 p.m. and closing about 6-6.30 p.m. (Greenwich time). Petals numerous, free almost to the base, in about four series, the outer reflexed, the inner slightly ascending-spreading, and the others spreading at different levels, 7-9 lines long, and 1-2 line broad, linear acute, entire, bright clear yellow above whitish-yellow on the back, shining. Stamens numerous all with anthers, collected into a cylindrical column 3½ lines long; filaments light yellow, anthers darker yellow. Top of the ovary very convex, six-grooved. Style none; stigmas 6 about 4 lines long as long as the stamens filiform, with revolute tips, light yellow. A native of Griqualand West, discovered by Dr. Sedgwick and Grey at Carnarvon (July 25, 1847). When in flower this is a very elegant species.

(Fig. 133) and *M. recumbens*† (Fig. 134) and described below, both

† *Mesembryanthemum recumbens*, N. E. Brown. Plant branching at ground level, forming a tuft of prostrate branches 2-3 inches long. Leaves in about five pairs to a branchlet, not separated by distinct internodes, slightly ascending-spreading, recurved at the apical part and also usually curved to one side, 4-12 inch parallel sides to about the middle, then tapering to an acute point, convex on the back with one tooth (rarely 2-3 teeth) on the keel below the apex, glabrous, greyish-green, conspicuously and densely covered with rather large and slightly prominent pellucid dots. Peduncle 1-flowered, bractless, erect, terete, green, faintly dotted. Calyx 3-lobed down to the ovary; lobes all reflexed, the 2 outer about 4 lines long, compressed and keeled at the apex with 1-3 teeth on the keel; the inner shorter 2 lines broad, ovate, obtuse, all with a short dorsal point, green, glaucous-dotted. Corolla 1 inch in diameter, expanding about 3 p.m. and closing between 6 and 7 p.m. (Greenwich time), scarlet or usually so; petals 50-60, free nearly to the base, in 3 series, the inner series ascending-spreading, forming a sort of cup, the other 2 series spreading more widely or deflexed at different levels. Stamens numerous, all with anthers, collected into a cone 3½-4 lines long; filaments light yellow, anthers darker yellow. Top of the ovary flat. Style none; stigmas 5, about 4-4½ lines long, filiform, finally spreading out from between the stamens, with

303 revolute tips, light yellow. A native of the Orange free State, on Konjes, near Bloemfontein, Fole Evans 7483.

of them very elegant plants when in flower, should belong to the same genus or not. The leaves of *M. recumbens*, with the curious tooth on the back, are similar to those of *M. unidens*, yet the glaucous and not pellucid dotted foliage and rosy-flowers of the latter render it quite distinct. N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 70: 311. 1921.

(Continued from page 303.)

311 Most of the plants I am separating from the genus were totally unknown to Linne, so that they cannot be considered as having been included in it by him. But the plants of the *M. linguiforme* and *M. difforme* type, which I am also separating, were included in the genus by Linne, although from his remark under *M. linguiforme* "this is 10-styled," he evidently knew that it differed from the rest of the genus in that character, but appears not to have quoted that it also differed by the stigmas being very stout and plumose, and therefore not conforming to his character of stigmas "subulate."

I now give the characters of some generic names proposed by Haworth that have been overlooked and the new genera I propose to establish, together with a list of the species that I consider should be placed under each.

Glottiphyllum, Haw.

This generic name was proposed by Haworth in 1821 in his *Revisions Planarum Succulentarum*, p. 103, under *M. semicylindricum* at the bottom of the page, where he states that the section "*Linguiformis* constitutes a good genus, (for which) I propose the name *Glottiphyllum*." This name seems to have hitherto escaped the notice of all authors, but as I consider Haworth to be correct in regarding these plants as forming a distinct genus, and one that can be recognised at sight, I accept his generic name and characterise the genus as follows:-- Very dwarf, succulent plants branching close to the ground. Leaves 4 or more to each branch, long, narrowly tongue-shaped, half cylindric or subcylindric, soft and pulpy, uniformly green, never glaucous-green. Flowers large, yellow. Calyx 4-lobed to the top of the ovary. Petals in one or two series. Style none; stigmas 8-10 radiating, stout and plumose; Capsule 8-10 celled; cells roofed by cell-wings, and the opening at the outer end of the wings more or less closed by a large tubercle, as shown in type D of Fig. 62 on p. 151.

This genus includes the sections *Linguiformis* and *Difformis* of *Mesembryanthemum*, which only differ from one another by the shape of their leaves, and in this character they grade into each other. The nomenclature of the species belonging to it is in very great confusion, principally caused by modern monographers of the genus (Sonder and Berger) assuming that the names applied by Salm Dyck to his excellent figures are correct, whereas they are often entirely wrong, for Salm Dyck seems rarely to have taken the trouble to verify the names under which he cultivated the plants,

311 but to have accented them as unimpeachable, so that his determinations are often very untrustworthy. Another cause of the difficulty in correctly defining the species is that in this country we have no means of knowing to what extent the same species really varies under natural conditions in South Africa, nor have we any knowledge of the localities in which the species grow.

That there are several distinct species among them I feel sure, but they are not the species that are usually found in gardens, which are mostly forms or hybrids of one species (*S. laurifolius*, I think) grown under different specific names. At the same time I believe that some of the plants that have been described as distinct species are merely forms of other species, for there can be no question that some of these plants vary so greatly that it is very difficult to find absolute characters for distinguishing them. As an illustration of this, I may mention that one of the most prominent distinctive characters is whether the leaves are all arranged in two ranks spreading right and left, or whether the successive pairs cross one another. This is a well marked and easily recognised distinction.

N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 70: 327. 1921.

(Continued from page 311.)

327 Few would hesitate to say that the two plants illustrated in Fig. 146 were two perfectly distinct species, the only thing they

Fig. 146 -- *Glottiphyllum pustulatum* ?

Two plants raised from seeds taken from the same seed pod and grown in the same 6-inch pot under similar conditions. About one-fourth natural size.

have in common being the pallid swelling (or so-called pustule) at the base of each leaf on the upper side, which is scarcely evident in the much reduced photograph. Yet these two plants were raised by natural selection from the same seed pod and have not. This seed-pod was upon a living plant collected at Alice, in South Africa, and sent to me last year by Mr. F. H. Little. The two seedlings figured are of the same age and have been growing in the same pot, out of doors, and exposed to the full sunlight of this summer from May to October 24th. Most of the seedlings are like the small plant, and three like the long-leaved one. Their distinct appearance is one of the greatest surprises I have had, and clearly demonstrates that the proper defining of the species belonging to this genus cannot be done in this country. In connection with the two-ranked arrangement of the leaves common to many of the species of this genus, it may be of interest to say that in the seedling stage the first few pairs of leaves that appear are always developed in an alternating manner, the alternating pairs being placed at right angles to each other; the change to a two-ranked arrangement takes place when the seedlings are a few months old. This would seem to indicate that this genus has

327 evolved from plants having a cruciate arrangement of the leave.

In consequence of my ignorance of the amount of variability and the native localities (which are important) of these plants, the following list must be accepted as provisional. In it I have omitted all reference to the work of Sonder in the *Flora Senensis*, and that of Berger, as these authors have often ignored the original descriptions of Haworth and replaced them by the erroneously named descriptions of Salm Dyck, so that the names as given in those works do not always belong to the plants that report intended should bear them. As Haworth's works are rare and very difficult to obtain, I have added to the names of the chief characters taken direct from his descriptions or from the original figure he quotes, and I have quoted the figures that I think belong to each species as I understand it.

To save space the letter M. is used for *Mesembryanthemum* in the synonymy of each species.

A. Leaves distinctly arranged in two ranks.

1. Flowers sessile or subsessile. See also note under *G. longum*.

1. *G. angustum* N. E. Br. Leaves 3-5 m. long and $2\frac{1}{2}$ in. broad, half-cylindric, flattish above, convex beneath, of nearly equal thickness throughout, obtuse. Flowers subsessile, 3-4 inches in diameter; petals broader than any other (except *G. grandiflorum*), and united for more than $\frac{1}{2}$ in. at the base. Haworth states that his species is recognised at first sight by its semicylindric leaves.

M. angustum, Haw. Obs., n. 176 (1794), and Misc. Nat. n. 34, not of other authors.

2. *G. depressum* N. E. Br. Leaves 2-ranked, pressed to the ground, 2-3 in. long, $\frac{1}{2}$ -2 in. broad, narrowly tongue-shaped, obtuse, with the apex variously incurved. Flowers subsessile or sessile, 3-3 $\frac{1}{2}$ in diameter. Capsule depressed.

M. depressum, Haw. Misc. Nat. p. 33 (1805), Bot. Mag. t. 1866, not of Salm Dyck.

M. rufescens Haw. Synon. p. 221 (1818), and Suppl. n. 89.

Under this species, I think, should also be placed *M. fragrans*. Salm Dyck, Obs. Bot. p. 8 (1820), and Mes. 8, f. 2; Link and Otto, Ic. Pl. Sel. p. 93, t. 43, which has sessile flowers 3 in. or more in diameter, that are very fragrant.

3. *G. grandiflorum*, N. E. Br. Leaves 2-ranked, pressed to the ground, about 3 $\frac{1}{2}$ in. long and 1 $\frac{1}{2}$ in. broad, very thick, tongue-shaped, with a large pustule at the base on the upper side. Flowers usually sessile, 4-4 $\frac{1}{2}$ in. in diameter, petals in two series, 3-4 lines broad, obtuse. Capsule somewhat conical.

M. grandiflorum, Haw., in Phil. Mag. v. 68, p. 327 (1826); Salm Dyck, Mes. 88, f. 3.

4. *G. linguiforme*, N. E. Br. Leaves 2-ranked, pressed to the ground, 3-4 in. long, 1 $\frac{1}{2}$ -1 $\frac{3}{4}$ in. broad, straight, tongue-shaped, often with a slight notch on the upper edge, and c

327 "white cartilaginous ridge at the inner bases of most, especially the young ones." Flower sessile, 2-4 in. in diameter.

M. linguiforme, Linn. Sp. Pl. ed. 1, p. 488, not of other authors. *Mon. Brwon*, *Folio colluto*, Dillen. Hort. Etlh., n. 235, t. 183, f. 224; N. E. Br. in Journ. Linn. Soc. Bot., v. 45, p. 70.

M. scalaratum Haw. Obs. n. 187; Salm Dyck, Mes. 8, f. 1.

Probably *M. lucidum*, Mill. Gard. Dict. ed. 8, no. 43, belongs to this species.

II. Flowers on pedicels $\frac{1}{2}$ -2 inches long.

5. *G. rustulatum*, N. E. Br. Leaves tongue-shaped, ascending, 5-8 in. long, 2-11 lines broad, with a large rustule at the base on the inner (upper) side. Flower about 2 $\frac{1}{2}$ in. in diameter.

M. rustulatum, Haw. Suppl. 88 (1819), and Salm Dyck Mes. 8, f. 10 and 10 $\bar{1}$; N. E. Br. in Journ. Linn. Soc. Bot. v. 45, p. 133.

I believe that the plants represented in fig. 146 belong to this species but I have not yet seen the flowers. *G. rustulatum* was introduced by Archell, who collected it near Lost Elms, whilst my plant was collected by Mr. J. J. Tealie, at Alice, about 100 miles to the north-east of that locality. The so-called rustule is a very slight swelling of a paler colour than the rest of the leaf, and is absent from all the following:--

6. *G. latum*, N. E. Br. Leaves 2-ranked, pressed to the ground, about 2-3 in. long and $\frac{1}{2}$ -1 in. broad, without a boss at the base, straight, linear-oblong, obtuse. Pedicels $\frac{1}{2}$ -1 in. long. Flower up to 2 $\frac{1}{2}$ in. in diameter. Corolla 7-8 lines in diameter, with a raised dome-shaped top, 10-11 celled.

M. latum, Haw. Obs., n. 181 (1894), founded upon *M. folio linguiformi latiore*, Dillen. Hort. Etlh., n. 236 t. 184, p. 221, and see N. E. Br. in Journ. Linn. Soc. Bot., v. 4, p. 39.

M. linguaeforme, Lodd. Bot. Cab., t. 1, 307, not of Linne.

M. linguiforme var. *latum*, Salm. Dyck, Mes. 8, f. 8B.

M. ascendens, Salm. Dyck, Mes. 8, f. 4, not of Haworth.

M. medium, Haw. Suppl., n. 88 (1819); N. E. Br. in Journ. Linn. Soc. Bot., v. 45, n. 132. This species was collected by Archell by the Little Rock River in Cassel Bay Division.

Haworth (Rev., p. 98) states that this ancient species was sent to him with others in 1819) from Oxford Botanic Garden, and that there is every reason to suppose that the plants are legitimate descendants of the Sherardian stock at Etlh. (i.e., the plants figured by Dillenius). Of all the plants Dillenius figured, "*M. serratum* alone is lost; all the others are now alive before the author." From this statement it may be assumed that his *Miscellanea*, n. 52, however, he described the flowers of this species as "mostly sessile," and those of a variety (to which he does not give a name) as having a "short trigonous pedicel." So, perhaps, they vary in this character, but Dillenius figures them with distinct pedicels. The variety *breve*, Haw., I believe belongs to *G. obliquum*. N. E. Brwon

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 70: 336. 1921.

(Continued from page 327.)

336. 7. *G. obliquum*, N. E. Br.-- This seems very similar to *G. latum*; the leaves are represented as of the same shape and arrangement, but rather narrower, and the capsule is much smaller and less inflated at the top. Dillenius and Haworth considered it different, and the latter (under *M. lingueforme*) states that it differs from *M. latum* in the youngest leaves being ascending, more unequal and more hooked-incurved at the apex. The pedicels are about $\frac{1}{2}$ in. long, thickened upwards, angular. Sepals ciliate on the keel. Corolla 2 to nearly 3 in. in diameter, with the petals bright yellow inside, whitish-yellow on the back. The capsule, according to Dillenius's figure, is about 5 lines in diameter, and flattish at the tip.

M. obliquum, Willd., Sp. Pl., v. 2, p. 1027 (1799), founded upon *M. folio linguiformi angustiore*, Dillen., Hort. Elth., p. 237, t. 184, f. 226; N. E. Br. in Journ. Linn. Soc. Bot., v. 4, p. 71.

M. lingueforme, Haw. Obs., p. 182 (1794), and Rev., p. 97, with several varieties, of oblique; Haworth gave the name *M. linguiforme* of Linne, and used that name for this plant, which Linne had regarded as a variety of it (var. y.). Willdenow corrected this mistake, but modern authors have fallen into a further error of applying the name "linguiforme" chiefly to forms of *G. longum*. I believe that *M. latum* var. *breve*, Haw. Rev., p. 99, which he distinguishes from typical *M. latum* as having the "leaves more depressed, capsule smaller," belongs to *G. obliquum*.

8. *G. uncatum*, N. E. Br.-- Leaves 2-ranked, about $2\frac{1}{2}$ in. long and 8-9 lines broad, strap-shaped, flat above, obliquely convex beneath, variously uncurved-hooked and incurved at the thickened apex, pedicels $\frac{1}{2}$ -1 in. long, corolla about 2 in. in diameter, petals in two series. Stigmas 10, short. Capsule large, depressed.

M. uncatum, Salm. Dyck, Mes., § 8, f. 6.

M. longum var. *uncatum*, Haw. Suppl., p. 97 (1819).

9. *G. cultretum*, N. E. Br.-- Leaves 2-ranked tongue or strap-shaped, 2-4 in. long and about 1 in. broad, pressed to the ground, more or less sigmoid-curved, obtuse, with the upper margin upcurved or slightly hooked at the top. Pedicels $1\frac{1}{2}$ in. long. Flower to $2\frac{1}{2}$ in. in diameter.

M. cultretum, Salm. Dyck, Mes., § 8, f. 7, (1820), and Mes., 8, f. 5.

M. depressum, Salm. Dyck, Mes., § 8, f. 7, not of Haworth.

M. linguiforme, Salm., Dyck. Mes., § 8, f. 8 (not 8B), not of Linne nor Haworth. See also N. E. Br. in Journ. Linn. Soc. Bot., v. 45, p. 71. under *M. obliquum*.

M. longum var. *declive*, Salm. Dyck, Mes., § 8, f. 9 B.

N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 71: 9. 1922.

(Continued from page 336, Vol. LXX.)

- 9 10. *G. longum*, N. E. Br.-- Leaves 2-ranked, tongue or strap-shaped, 3-5 in. long and about $\frac{1}{2}$ in. broad, ascending or spreading, moderately straight, variably obtuse or more or less hooked at the apex. Pedicels up to 2 in. or more long. Flower 2-2 $\frac{1}{2}$ in. in diameter. Capsule 6-7 lines in diameter, slightly domed at the top.

M. longum, Haw. Chron., p. 177 (1794), founded upon *M. foliis linguiformi longioribus*, Dillen, Hort. Dyck., p. 202, t. 16, f. 227; N. E. Br. in Journ. Linn. Soc. Bot., v. 45, p. 70.

M. linguiforme, D. C., Fl. Grasses, t. 71, not of Linne.

M. lucidum, Haw., Suppl., p. 39 (1811), and Rev., p. 98.

M. adscendens, Haw., Synop., p. 220 (1812), not of Salm. Dyck.

This species is distinguished from the others that have 2-ranked leaves, by the ascending leaves and long pedicels. But in his Revisiones, p. 96, Haworth seems to have substituted a different plant, with several varieties to it, having sessile or subsessile flowers. With the exception of the variety *uncatum* quoted under *G. uncatum* (p. 336, 1921), I can find no clue to what plants these may have been, but think it quite possible they may have been hybrid forms raised from seeds produced in Europe, and I feel sure that several of the forms now cultivated under this and various other names are also of hybrid origin.

The plant figured as *M. heterophyllum*, Jackson in Andrews Bot. Rep., v. 8, t. 540 (not of Haworth), I suspect to have been one of these seminal forms. It has very long leaves irregularly incurved-hooked at the apex, pressed to the ground and flowers about 2 in. in diameter on pedicels an inch or more long. Haworth (Rev., p. 102) names this plant *M. angustum* var. *heterophyllum*, but according to his original description of *M. angustum*, it has nothing in common with that species. It may be the same as *M. longum* var. *flaccidum*, Haw., Synop., p. 22.

A. A.--Leaves not in two regular ranks, but pointing in various directions, the pairs crossing one another obliquely or rarely at right angles.

* Leaves usually broader than thick, flat above, without a hump or teeth on the flat face.

11. *G. taurinum*, N. E. Br. Leaves obliquely cruciate, half-cylindric, obtuse, very thick, incurved, "less cruciate than *M. cruciatum*, usually somewhat finger-like and nearly the size of a finger, the younger incurved like the horns of a bull." Flowers sessile; stigmas 8.

M. taurinum, Haw., Synop., p. 224 (1884). I think it probable that to this species should be referred *M. angustum*, Salm. Dyck, Hort. Dyck., 1818, p. 17, and Mes., §7, f. 6 and 6B (not of Haworth, but named by the latter *M. uncatum* var. *gallianum*, Rev. p. 101, with the statement that it is "perhaps a distinct species or variety of another species"). Its flowers are 2-2 $\frac{1}{2}$ in. in diameter.

9 12. *G. praepingue*, N. E. Br. Leaves obliquely cruciate, not depressed, up to 3 in. long, some tongue-shaped with the points obliquely incurving, others narrower without any oblique curve or ridge near the point, others with subulate triangular or broad compressed points, bent and ending in a soft white bristle, whitish or shining near their bases, or as if frosted over with exceedingly minute papillae, when young minutely ciliate. Flower about 2 in. in diameter, nearly sessile, or according to Salm. Dyck with a pedicel 9-10 lines long. Stigmas 8.

G. praepingue, Haw., Obs., p. 179 (1794); Salm. Dyck, Mes., §7, f. 5.

13. *G. cruciatum* N. E. Br. Leaves exactly cruciate (but the pair as figured by Salm. Dyck are obliquely crossing each other), 3-in. long, 1 in. broad at the base; all old leaves appear swollen (? convex) on the upper side, particularly near the somewhat dilated base. Pedicels stout, 1-2 in. long, of equal thickness to the very calyx. Flower large. Petals not so long as those of *G. difforme*, but broader. Stigmas 8-9.

G. cruciatum, Haw., Obs., p. 173 (1794), and Misc., n. 35; Salm. Dyck, Mes., §7, f. 7.

If Salm. Dyck's figure correctly represents Haworth's species, the leaves are unequal, much curved, 2-4 in. long and 6-9 lines broad, semi-terete, flat above nearly to the obtuse tip. Pedicels 2 in. long. Flower 2 in. in diameter.

14. *G. salmii*, N. E. Br. Leaf-pairs crossing one another, variously curved, 3-4 in. long, 7-9 lines broad at the base, thence tapering to an acute point, flat above, convex beneath, with the apical part sometimes obliquely prolonged beyond the flat surface and laterally compressed or keeled. Flowers sessile, 2-2½ in. in diameter. Capsule depressed, half included.

G. salmii, Haw., Suppl., p. 89 (1819); Link and Otto, Icon. Fl. Sel., n. 95, t. 44; Salm. Dyck Mes., §7, f. 8.

Then above description, with the exception of that of the capsule, is made from Salm. Dyck's figure, as Haworth's original description is rather vague, and does not agree very well with Salm. Dyck's figure and description. But I think there can be no doubt that both descriptions refer to the same plant, the difference being caused by Haworth having described from a young plant that had not assumed the adult form. In his Revisiones, p. 100, he describes three varieties besides the type, all of which he states were received from Salm. Dyck. Original drawings of some of these varieties made in 1823 and 1826 are preserved at Kew, and merely represent young plants not arrived at maturity and as they seem better to agree with Haworth's description, support my above expressed view that he described from immature plants.

* * Leaves nearly cylindric, ascending, without teeth on the face.

15. *G. erectum*, N. E. Br. (new species, Fig. 5). Leaves 2-3 (rarely 4) pair to each branch or growth, suberect or ascending-spreading usually more or less curved, and the pairs set-

9 obliquely to one another, 2-5 inches long, 3 $\frac{1}{2}$ -4 lines broad near the base and 3-4 lines thick somewhat cylindric, but with the inner face more or less flattened, not at all keeled on the back, acute or subobtuse, smooth, glabrous, light green, not at all glaucous nor dotted. Flowers subsessile or on pedicels 1-2 lines long and 1 $\frac{1}{2}$ line thick. Calyx 4-lobes; lobes 3-4 $\frac{1}{2}$ lines long and as much in breadth, broadly ovate, obtuse, green, all with membranous margins. Corolla 2-3 inches in diameter, cup-shaped, expanding in sunshine, scentless; petals about 50, in 1 series, lax, 12-16 lines long and about 1 line broad, linear, very obtuse or subtruncate and notched at the apex, bright yellow on both sides. Stamens numerous, erectly spreading in a ring around the stigmas; filaments pale-yellow; anthers darker yellow. Stigmas 7-8, widely spreading, about 2 lines long, lanceolate, acute, plumose, pale yellowish-green. Capsule subglobose, with a high dome-like top, 3-5 lines in diameter, 7-8 valved.

Sent to me from Sevenfontein in Swellendam Division, by Dr. I. B. Pole Evans, 6922. It flowered in September, 1921.

This species is easily distinguished from all the others by its ascending, nearly cylindric-leaves. N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 71: 22. 1922.

(Continued from page 9.)

22

*** Leaves with a hump or food teeth on the flattened base.

16. *G. difforme*, N. E. Br. Leaves as described by Haworth obliquely cruciate, 1-6 in. long and $\frac{1}{2}$ - $\frac{1}{3}$ in. broad, some semicylindric from the base upward with a kind of half-twist at about the middle, with a sort of lobe-like tooth near the compressed-triquetrous or somewhat dolabriform tip, which often ends in a straight curved or hooked harmless bristle; other leaves without either a tooth or lobe-like rising, but hooked or gibbous near the point, or with a concavity above, one side of which forms a ridge. Some leaves microscopically ciliate towards the tip. Peduncle of plants flowering in the open air very short or scarcely any except the quadrangular base of the calyx. Flower 2-24 in. in diameter with fewer, longer and more lax petals than in *G. semicylindricum*, according to a drawing at Kew.

M. difforme, Linn., Sp. Pl., ed. 1, p. 487 partly, as to *M. foliis difformibus*, Dillen., Hort. Elth., p. 252, t. 194, f. 242 (not 241), and Haw., Obs., p. 169 (1795) not of other authors.

The two figures of Dillenius were considered to represent one species by Linne, but Haworth retained the name *M. difforme* for the plant represented by Fig. 242, and separated that figured at 241 under the name of *M. semicylindricum*, and he was probably right, for I have not seen any among the plants I have raised of the latter species at all like the Dillenian figure 242, which represents the pedicel as being about $\frac{1}{4}$ in. long and distinctly angular, and there is drawing at Kew, made in 1826, of what was doubtless the plant Haworth described, which has the pedicel about an inch long, much thickened upwards and almost winged-angular (Haworth states under *M. semicylindricum*, Obs., p. 17, "not of equal thickness"). But probably both these figures were

22 made from plants grown under glass, causing the pedicel to elongate. The plant figured by Salm. Dyck as *G. difforme* is a totally different species, represented with long cylindric pedicels that are not thickened upwards, nor at all angular.

17. *G. semicylindricum*, N. E. Br. Leaf-pairs obliquely crossing each other, variable in size, 2-4 in. long and 3-4 lines broad and nearly as thick, half-cylindric, but the flat face not nearly extending to the variably curved compressed tip, with two blunt teeth on the upper side beyond the middle. The leaves are sometimes turned or hooked with a short soft bristle. Pedicel 2-3 lines long, very slightly thickened at the apex and slightly angular. Corolla 11-12 in. in diameter; petals more numerous and more crowded than those of *G. difforme*, according to the New drawings of these species.

G. semicylindricum, Haw., Obs., p. 225 (1794), rounded upon *M. solidiflorum*, Willd. Bot. Bith., p. 122, t. 12, f. 241, which is a much reduced figure of the plant.

M. bidentatum, Haw., Suppl., p. 89 (1819); Salm. Dyck, Mes., §7, f. 1; N. E. Br. in Journ. Linn. Soc. Bot., v. 10, p. 178.

M. bigibberatum Haw., in Phil. Mag., v. 68, p. 22 (1820) not of Salm. Dyck.

I have this plant in cultivation, raised from seeds from Mount Stewart, Jansenville Division, sent to me by Dr. I. B. Pole Evans, 1870, and find that it varies very much in size and appearance. Haworth seems not to have realised that Dillenius' fig. 241 is a much reduced representation of the plant, and considered size of specific value. There is no difference whatever between his three supposed species.

M. solidiflorum, Salm. Dyck, Mes., §7, f. 2, not of Haworth; *M. difforme*, Salm. Dyck, Mes., §7, f. 3, not of Linnaeus nor Haworth; and *M. bigibberatum*, Salm. Dyck, Mes., §7, f. 4, not of Haworth; *M. difforme*, Salm. Dyck, Mes., §7, f. 3, not of Linnaeus nor Haworth; and *M. bigibberatum*, Salm. Dyck, Mes., §7, f. 4, not of Haworth are three differently named plates all representing the same species, and might even have been drawn from the same individual in different years. All the names that the plant represented are wrong, but I have not seen any plant like it, so refrain from giving it a name.

18. *G. ochraceum*, N. E. Br. Leaves 3-4 in. long, triangular or semiterete, obtusely pointed, slightly thickened upwards, one of each pair broader than the other towards the apex and slightly recurved, the other narrower and straight, flat above, one side convex, the other flat or even concave; the younger leaves finely ciliate. Pedicels 3-4 in. long, slightly compressed, thickened above. Calyx compressed to-shaped, 2-edged, 5-lobed, two of the lobes much elongated, leaf-like, 3-angled, ciliate. Corolla 11 in. or more in diameter; petals 8 lines long, in two series, recurved-spreading and oblique, brownish-yellow, paler on the back. Stamens numerous, erect, scarcely half as long as the petals; filaments, white. Ovary flattish-lanceolate, greenish-yellow.

M. ochraceum, Berger, Mesemb. and Portul., p. 234.

Doubtful Species.

M. heterophyllum, Haw., Obs., p. 420 (1794). This is quite

22 an unknown plant whose position is doubtful. It is not at all the same as *M. angustum* var. *heterorhynchum*, Haw., with which it has been confused by Bonnier. It is described by Haworth as a singular and very distinct species having robust green leaves that are not dotted, the lower being somewhat like those of *M. canum*, Haw. (not of Berger), and the upper somewhat like, but not quite so large as those of *M. difforme*, Linn. Nothing more is known of this species. Haworth (l.c., p. 36) states "I once saw two plants of this fine species alive in the collection of Messrs. Malcolm, nurserymen, at Kennington." Although placed under the *difforme* group by Haworth, I do not think it can be a species of *Glottiphyllum*.

M. surrectum, Haw., Rev., p. 101 (1821). This species also does not appear to be a *Glottiphyllum*, although placed in the same group by Haworth. According to a drawing of it at Kew it was raised in 1817 from seeds collected by Bowie. It is a very distinct species, with three pairs of ascending-spread-terete or nearly terete obtuse leaves about 2-2½ in. long, ½ in. broad, and nearly as thick, placed at right-angles to each other, and not at all tongue-shaped, of a dark green colour and not dotted. I have not seen anything like it.

N. E. Brown

(To be continued.)

Lesembryanthemum and some new genera separated from it.

Gard. Chron. III. 71: 44. 1922.

(Continued from page 22.)

LITHOPS, N. E. BROWN.

44 Very dwarf succulent plants, in nature growing buried in the ground with their tops scarcely, or not at all, rising above the level of the surface, consisting of a single growth or of two to many growths in a clump. Each growth a more or less obconic or rarely compressed cylindrical body with a transverse fissure across the top dividing it into two short lobes, flat or convex on the top when adult, but in a juvenile state with only a central orifice at the top, as in the genus *Conophytum*. Flower solitary, from the centre of the fissure. Calyx exerted from or partly included in the fissure, more or less compressed, without a tube above the ovary, 4-7 (usually 5-6) lobed. Corolla without a tube; petals numerous, widely spreading. Stamens numerous, collected into an erect column. Style short, sometimes almost absent; stigmas 4-7, filiform.

The above generic name which I give to the plants I now separate from *Lesembryanthemum* is formed from the Greek words *lithos*, a stone, and *ops*, the face, on account of their resemblance in colour and appearance to the stones and pebbles they grow among. The remarkable resemblance of these plants to pebbles is well demonstrated by an account given by Dr. R. Marloth in the Transactions of the South African Philosophical Society, Vol. 15, p. 100, in an interesting description of the manner in which plants imitate the ground and stones they grow among. Dr. Marloth states that Mr. Hammond Hook (? W. Hammond Tooke), "During a stay in the Karroo had often used a certain footpath which passed for some distance over bare ground, rarely covered with pebbles. One day, however, he saw some of these pebbles bearing bright yellow flowers,

44 one on the top of each stonelet. The number of these flowering pebbles increased every day until there were hundreds of them on the otherwise bare veld: It was *Mesembryanthemum truncatellum*, Haw., which occurred rather plentifully in this locality." The resemblance to pebbles must be very great for anyone to frequently walk over the ground on which they grow without discovering that they were not stones until flowers appeared. But Dr. Harloth is quite wrong in his identification of the plant, which I have no doubt whatever is a species of *Lithos* unknown to me at present. For *M. truncatellum* grows in tufts, does not resemble pebbles, but is glaucous-green and dotted, and has light straw-yellow flowers that only open in the evening. I have given an account of the resemblance of these plants to stones of p. 230 of Volume LXX., and have also there stated and explained that they all belong to the the small group known as "windowed plants." The window, however, is sometimes quite obscured by coloured pigment, which acts as a screen to soften the light, yet does not prevent it from penetrating into the interior of the plant and reaching the chlorophyll layer (see Fig. 112. p. 251, Vol. LXX.

When these plants are very young and have only a central orifice, there is nothing in their external appearance to distinguish them from the genus *Conophytum*; see, for example, Fig. 84, R, with 84, O, on p. 297, and with Fig. 97 on p. 223, Vol. LXX. But when the plant is older, the peculiar disposition of the chlorophyll layer, as shown in Fig. 112, p. 251, Vol. LXX., will at once serve to distinguish this genus from *Conophytum*, in which the chlorophyll layer is more or less uniform.

Although in nature these plants grow buried in the soil with the top level with or just rising above the surface, they often refuse to grow in that way in this country. For if planted with their tops just above or level with the soil, I have found that the first year they do not flower, and the second year they do not flower at all, doubtless due to the absence of such intense light as they get in their own country. On the contrary, I have one plant of *L. Lesliei* that I planted over two years ago with its top level with the earth in the pot, that has in no way changed or made any attempt to develop a new growth since it was planted, but has remained plump and healthy all that time, and has not flowered. But planting them level with the earth in this country is to risk their loss by rot, as I have found from experiment, for it is very difficult to know when the moisture in the soil is greater than the plant will endure at any particular season. For, as I have previously stated, the watering of these plants is an art requiring special knowledge. If sufficiently watered at the wrong season, they do not flower, and if over-watered, they rot. The thermometer and dryness of the atmosphere should also be consulted as guides to the amount of water that should be given and how often it should be applied; for a tablespoonful may be enough for three weeks in June or December, yet not enough for two or three days in August. I have found *L. fulviceps* and *L. optica* to be especially sensitive to a little too much water at the wrong season.

The plant I described in the Journal of the Linnean Society, Vol. 45, p. 68, as *Mesembryanthemum locale*, and associated with species of this genus, may belong here, but it only known from an imperfect, dried specimen, and cannot be properly placed until

44 the living plant from near the Gamka River is obtained, for after examining the specimen I am now inclined to think that what I supposed to be a transverse fissure may be only a furrow due to shriveling.

N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 71: 55. 1922.

(Continued from page 44.)

55 The following are all the species at present known to me, of which I have all but two in cultivation. For brevity in the synonymy the generic name Mesembryanthemum is indicated by the letter M.

A.--Surface minutely ruberulous, smooth and velvety to the touch.

(1) Lithos Friedrichiae, N. E. Br.--Growths up to 1 in. high, 10 lines broad, and 8 lines thick, dull red, or brownish-green, with the convex top of the lobes greener, without spots, and reflecting light like a looking-glass, although puberulous. Flower not seen, stated to be yellow.--Friedrichiae, Dinter, Neue und werre bekante Pfl. Deutsch-Sudwest Afr., p. 41. Great Namaqualand, near Warmbad.

AA.--Surface glabrous, opaque, not reflecting light (to the end).

B.--Flowers yellow.

C.--Top of the lobes tuberulate or with a more or less evident network of slight furrows or with slightly raised dots.

(2) L. turbiniformis, N. E. Br. (Fig. 28).-- Growths solitary or 2-4 in a clump, up to about 1 in. high, 1½ in. broad, and 1 in. thick, flat at the top, which is either distinctly tuberulate or marked with a sort of network of slight furrows varying from light rusty-ochreous to a dark ironstone colour, with the furrows of a darker tint, not spotted. Calyx unequally 6-lobes, stout, compressed; lobes 2-10 mm. long, 4-7 mm. broad, oblong or ovate-oblong, obtuse, green with reddish tints. Corolla about 1½ in. in diameter; petals 50-60 in about 2 closely overlapping series, widely spreading, 6-8 lines long, about 1 line broad, linear, tapering towards the base, bright yellow on the inner face, whitish on the back. Stamens collected into a column about 4 lines long; filaments yellow, falling into white at the base; anthers orange-yellow. Ovary slightly convex at the top. Stigmas usually 6-7 (sometimes 5), finally 6-7 lines long and exceeding and curving over the stamens, filiform, yellowish. Capsule somewhat compressed, 4½-6 lines in diameter, 6-7 valved. Seeds smooth, brown.-- M. turbiniformis, Rev. Rev. p. 34 (1881); Burchell, Travels, Vol. 1, p. 310; D. C., Prodr. Vol. 3, p. 417;

55 Don, Gen. Syst, Vol. 3, p. 126; Berger, Mesemb., p. 291; M. Hookeri, Berger, Mesemb., p. 291 and 294, p. 54, copies from Bot. Mag., (1908). *L. truncatellum*, Hook, f. Bot. Mag., t. 8077, not of Haworth.

Frieske Division, at Land Vlei, Burchell, Table Mountain. This species was the first that was discovered of these very remarkable "mimicry" and "windowed" plants, but as I have already given some account of its discovery and rediscovery on p. 250, Vol. I., I need only add here that the above description was made from the living plants that were so generously sent to me by Dr. I. B. Table Mountain, and the figure is reproduced from a photograph kindly sent to me by Dr. T. N. Leslie. This figure represents the tuberculate form, but I also have other forms that are very much smoother with only a few lines of slightly irregular lines upon the top of the plant.

In this very interesting account of plant mimicry, Dr. Marloth (Trans. S. Afr. Phil. Soc., Vol. 15, p. 99), remarks that Burchell, "in his travels through the Karroo found a species of Mesembryanthemum which he named *M. turbiniforme*, thinking it to be undescribed. As a matter of fact it had been found by Thunberg, who had named it *M. truncatum* from the shape of its leaves." Dr. Marloth has in this been misled by Sonder's union of these two species in the *Flora Capensis*. For not only are they two utterly different species, but one is a *Lithops* and the other a *Conophytum*, and grow about two hundred miles away from each other.

(3) *L. fulvicornis*, N. E. Br.-- Growths solitary or 2-4 in a clump, up to 1 in. high, 1 1/2 in. broad, and 1 in. thick, nearly flat or slightly convex at the top, which varies from bright fulvous to dingy pinkish-rust colour, thickly sprinkled with rather large, round, dark green dots, which are usually slightly raised, but sometimes almost even with the surface, and scattered among the dots are few or several inconspicuous slender dark orange-red irregular lines or dots, usually placed in slight depressions of the surface, so that the latter is usually very slightly tuberculate-rugulose to the touch. Calyx 4-6 lobed; lobes 2 1/2-5 lines long, 1 1/2-7 lines broad, linear-oblong, obtuse, brownish or brownish-fulvous, sometimes tinted with pale violaceous, dotted. Corolla 10-14 lines in diameter, expanding between 3 and 4 p.m. (Greenwich time), and closing at night, lasting about a week, odourless; petals 40-45, in about 2 series, 4-5 lines long, and less than 1 line broad, linear, sub-acute, the inner bright yellow on both sides, the outer whitish with a faint pink tinge on the back, with the tips often becoming more or less red on both sides. Stamens about 3 lines long; filaments deep yellow ochraceous fading to pale yellow at the base; anthers yellow. Style short, up to 1 line long, stigmas 4-6, about 3 lines long, slightly exceeding the stamens, 2-lipped, rich citrine yellow.--*L. fulvicornis*, N. E. Brown., in Rev. Bull., 1911, p. 127; Bot. Mag., t. 8976, in a travelling bag figure of the plant. Great Karroo plain, Great Karroo Berg Range, on sandy plain at South Karroo, 4,000 ft. above sea level, Pearson 7812.

Described from living plants sent to England by Prof. H. H. W. Pearson. In my original description I stated that this plant is smooth on the top; that statement was based upon a single specimen which probably was nearly smooth, but numbers of others examined since were as above described.

N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 71: 65. 1922.

(Continued from page 55.)

65

CC.--Top of the lobes entirely without tubercles or slight furrows or raised dots when in a plump growing condition, smooth except sometimes in *L. Lesliei*.

(4) *L. pseudotruncatella*, H.E.Br. (Fig. 33).--Growths solitary to many in a clump, up to 1 in. high and 1p in. in diameter, flat or the lobes slightly convex on the top, varying from pale grey to brownish-grey with a slight pinkish tinge, covered with numerous branching lines or dendritic markings of a darker colour formed of confluent dots, mingled with some separate dots. Calyx 6-7-lobed; lobes 3-5 lines long, $1\frac{1}{2}$ -2 lines broad, oblong or ovate-lanceolate, obtuse, pale greyish-green with a brownish tint. Corolla $1\frac{1}{2}$ -2 in. in diameter, opening soon after mid-day and closing between 6 and 7 p.m. Corolla of 5 successive days, a double flower; pet 15-50-60, in 2-3 series, $\frac{1}{2}$ -1 in. long, and about 1 line broad, linear, narrowing to the base, obtuse, bright yellow, with a white line on the inner face, faintly pinkish-white on the back. Stamens 3-4 lines long; anthers and upper part of the filaments pale orange-yellow, lower part of the filaments white. Stigmas 5-7, free almost or quite to the base, equalling or slightly exceeding the anthers, filiform, pale orange-yellow.--*M. pseudotruncatellum*, Berger, Mesemb. p. 289 and 286, Fig. 4 (1908); *M. truncatellum*, W. Watson, in Gard. Chron., 1900, Vol. 27, p. 211, with Fig., not of Haworth; *M. truncatum*, Dyer, in Ann. of Bot., Vol. 20, p. 125, t. 7 (1916), not of Thunberg.

Dameraland, near Jakalswater, Roessing, Farm Hoffnung and Aus Mountains, Dinter.

Described from living plants raised from seeds sent to Kew in 1903, by Mr. E. S. Pillans, who informs me that the locality "Hinterland of the Orange River" quoted for it by Dyer in the Annals of Botany is entirely wrong, and that when he sent the plant to Kew on January 11, 1903 (by error dating his letter 1902), he wrote that he was "positively" sure of the plant together with some seeds of *Mesemb. truncatellum* from German South-West Africa, which were given to him by Mr. Dyer, who probably received them from Dinter. The latter, in writing of this plant (without name) in the Gardeners' Chronicle, 1900, Vol. 27, p. 115, states that "this plant so closely resembles, when not in bloom, the form and colour of the pebbles among which it grows, and it can only be detected by an experienced eye."

The beautiful flowers of this species afford an excellent example of their daily increase in size which I allude to in Vol. LXX. One that I measured on the first day of its opening was $1\frac{1}{3}$ in. in diameter, on the third day it was $1\frac{1}{2}$ in., and on the sixth day $2\frac{1}{2}$ in. in diameter. The time of expansion and closing above mentioned seems rigidly adhered to, but only if the sun is shining and the temperature high enough, otherwise the flower will not open.

(5) *L. Lesliei*, H. E. Br. --Growths solitary or 3-4 in a clump, up to $1\frac{1}{2}$ in. high, $1\frac{1}{2}$ in. broad and $1\frac{1}{2}$ in. thick, flat on the top, smooth or slightly harsh or irregular to the touch, but without an impressed reticulation, dark green or olive-green, densely or sparsely covered with dull orange or rust-coloured irregular spots or dendritic markings. Calyx 5-6 lobed; lobes $2\frac{1}{2}$ -4

80 in full sunshine and closing at dusk, scented; petals about 40, of about 2 closely overlapping series, 6-7 lines long and 1-1 1/2 line broad, obtuse, pure white on both sides, very shining. Column of stamens 1 in. long, white, with yellow anthers. Top of the ovary flat; style very short; stigma 6, finally about 12 lines long, at first erect, but when the petals fade they spread widely from the base, pushing the style away so that the latter form a sort of ring around them, and they are revolute at the tips.--M. marmoratum, N.E.Br., in Journ. Linn. Soc. Bot., v. 45, p. 68.

South Africa: locality unknown, Fillans

(8) *L. optica*, N.E.Br.--Growths forming clumps of 4-15 to a plant, each 6-8 lines high and 6-7 lines in their greater diameter, with the top of the lobes slightly convex, with narrow whitish or whitish-brown margins, and the central part greenish-white or pale greenish-white sometimes tinged with pink, without or occasionally with 1 or 2 whitish spots. Calyx 5-lobed; lobes, 1 line long, 1/2 in. in diameter, expanding only in bright sunshine; petals numerous, 3-4 lines long, pure white or tinged with pink. Stamens white, with yellow anthers. Stigmas 5, filiform greenish.-- *L. marginatum*, Marloth in a note under *L. rhopalophyllum* Schlechter, on p. 406 of the same work.

Great Namaqualand: near Prince of Wales Bay, in sand-covered fissures of gneiss rocks, Marloth, 4,373; on rocky hills at Luderitz Bay, Pole Evans, 7,210.

I have not seen fresh flowers of this species, as my plants of it have not yet flowered.

(9) *L. bella*, N.E.Br.-- Growths at first solitary, forming clumps with age, increasing slowly, each up to about 1 in. high and 1 in. in their greater diameter, with the top of the lobes convex, having a rather broad, light brown or buff-brown border, enclosing an irregularly lobed fuscous or greenish central area with or without 1 or 2 brown spots upon it. Flowers not seen, stated to be white and shining.

Great Namaqualand; near Aus, Phillips.

When sufficiently supplied with water the top of the lobes is even and smooth all over, but under very dry conditions the central part becomes slightly sunk below the level of the marginal part. I am indebted for this pretty species to A.M. Sergeant E. C. Phillips, who informs me that it grows on the top of small boulders in sandy, gravelly soil and is so similar in colour to the soil that it is difficult to detect. It has not yet flowered with me.

(10) *L. damarana*, N.E. Br.--Plant solitary or of few growths in a clump, increasing slowly under cultivation. Each growth 1-1 1/2 in. high and up to 1 1/3 in. in its greater diameter; lobes flat or very slightly convex on the top, very pale brown or fawn-colour, marked with distinctly impressed branching lines and spots forming a sort of pattern of a rich, dark brown or dark grey colour. Calyx 5-6-lobed, much compressed and about 5 lines broad; lobes 2-3 lines long, 1-2 lines broad, or 1/2 in. or above, obtuse, some with membranous edges, dull reddish-brown. Corolla 1-1 1/2 in. in diameter, opening about 1 p.m. and closing between 4 and 5 p.m. and lasting for about a week, not scented; petals 30-36, in about 2 closely overlapping series, 5-9 lines long and about 1 line broad, linear, obtuse, pure white on both sides, slightly shining. Col-

80 umn of stamens $2\frac{1}{2}$ - $3\frac{1}{2}$ lines long, white with yellow anthers. Top of the ovary flat. Style absent; stigmas 5, filiform, revolute at the tips, light yellow.--*M. damaranum*, N.E.Br., in Journ. Linn. Soc. Bot., vol. 45, p. 67.

Damaraland, locality and collector unknown.

I received specimens of this plant some years ago without information, except that they came from Damaraland. Subsequently some plants were sent to me from Omaruru and Aus and arrived in a very shrivelled condition, so that I mistook them for the same species as the above, and, therefore, wrongly mentioned those places as localities for *M. damaranum*, in the journal above quoted. The Omaruru plant died without rooting, but I believe it to have been the same as that from Aus, which, now that I have it in plump condition, agrees with the description of *M. damaranum*, as described above as *L. bella*. I am under the impression that Prof. Berger sent *L. damaranum* to me from the Great Karasberg Range, and that it died, but I have no note to that effect and may be mistaken.

N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 71: 92. 1922.

(Continued from page 80.)

Argyroderma, N.E. Br.

92 Stemless succulent plants. Each plant or growth with two or (rarely) more (rarely) more (rarely) more, thin, ascending spreading leaves, united for about half their length at the base, flat above, very convex on the back, and sometimes with the lower part rounded towards the base and very obtuse, rounded; with or without a faint keel; very firm or hard in substance, with a very smooth white or greenish-white (or rarely rosy-tinted) skin, without dots or markings. Calyx produced above the ovary into a short tube, 6-lobed. Petals numerous, free. Stamens very numerous, inserted in the tube of the calyx at the base of the petals. Stigma sessile on the top of the ovary, circular, entire or faintly crenate. Ovary inferior, 10-24 celled. Capsule 10-24 valved. Seeds numerous in each cell.

This genus is distinguished from all its allies by its sessile entire stigma, and the very smooth white skin of the short broad leaves, the latter characters serving to distinguish these plants from all those seen out of flower. The generic name is derived from the words *argyros*, silver, and *derma*, skin.

Berger associates the type of this genus (*A. testiculare*) with *Mesembryanthemum Bolusii*, but in the nature of the leaves and structure

93 of the flowers the two plants are entirely different.

The species of this genus are easy to discriminate at sight when seen growing together, yet I find it very difficult to define them in words so that they can be determined from description, especially as I have seen flowers of only two species. They are not difficult to cultivate if properly attended to and not over-watered. Like most of their allies they attempt to grow and flower between October and March, which is their summer season in their native country; during this period the rainfall of that region takes place, so that under cultivation it is necessary to

93 give them just sufficient water to enable them to develop their flowers and fruit. At the same time their roots should be kept fairly warm, for in their native country the ground gets much more heated during the day and keeps them from being harmed by the rain. A cold, moist soil does not suit these plants. The following are all the species known to me. For brevity in the synonymy the letter M is used to indicate the genus Mesembryanthemum.

Leaf from nearly as broad as, to broader than long, white, with the edge of the flat face sharp and outlined by a very slender, slightly raised line or ridge that is not cartilaginous.

1. *A. testiculare*, N.E.Br. Plant usually of only a single growth. Leaves with the flat face $\frac{1}{2}$ -lin. long, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. broad, and $\frac{1}{2}$ -lin. thick, broadly ovate or somewhat oblong, pointed like a Gothic arch or broadly rounded at the apex, with the dorsal part often prolonged beyond the apex. Flower sessile bet. the leaves, with two bracts under it. Calyx-lobes 2-3 $\frac{1}{2}$ lines long, deltoid-ovate, obtuse. Corolla 1-2 in. in diameter; petals numerous in about 2 series, white or yellow. Ovary in double ring, with yellow anthers. Top of the ovary flat. Stigma $1\frac{1}{2}$ -2 lines in diameter, circular or elliptic, concave, entire or faintly crenate. Capsule 4-7 lines in diameter, flat or very slightly convex on the top, 12-24-valved and 12-24-celled.

M. testiculare, Ait. Hort. Kew, ed. 1, v. 2, p. 181 (1789); Haw. Rev. p. 85.

Var. *luteum*, N.E.Br. Petals bright yellow. *M. testiculare* B. Sims in Bot. Mag. t. 1573. *M. octophyllum*, Verlot in Rev. Hort. 1869, p. 35, f. 10, copied from Bot. Mag. (This is not *M. octophyllum*, but, although quoted as such by him, but from Dr.)

Var. *roseum*, N.E.Br. Petals bright magenta-purple. *M. testiculatum*, Jacq. Fragm. p. 20, no. 73, t. 12, f. 2. *M. octophyllum* var. *roseum*, Haw. Rev. p. 85.

Var. *Pearsonii*, N.E.Br. Flower with a distinct pedicel up to about $\frac{1}{2}$ in. long. Corolla with the outer petals magenta-purple and the inner ochraceous yellow more or less striped with purple. *M. Pearsonii*, N.E.Br. in Kew Bull. 1912, p. 277, and Bot. Mag. t. 2463.

A native of Van Rhynsdorp Division; originally introduced by Masson, who discovered it in company with Thunberg, whose type specimen I have seen. This species offers an excellent example of the manner in which some of these plants vary in colour of their flowers, as stated on p. 290 of vol. LXX. Dr. Rodier has raised from seeds three or four plants, some with yellowish-white, others with yellow, and others with purple flowers. I now think it probable that the variety *Pearsonii* may be a hybrid between a purple-flowered and a yellow-flowered form. Its flower is exceedingly beautiful.

2. *A. subalbum*, N.E.Br. Plant tufted with age. Leaves with the flat face $2\frac{1}{2}$ -7 line long, 4-8 lines broad, and 3-5 lines thick, broadly ovate in outline, obtusely pointed or circularly rounded, the dorsal part not produced beyond the flat face, obtusely rounded, faintly keeled. Flowers not seen. Capsule 4 lines in diameter, convex at the top, 10-valved and 10-celled. *M. subalbum*, N.E.Br. in Journ. Linn. Soc. Bot. v. 40, p. 91.

Van Rhynsdorp Division: Near Bakhuis, Pillans, 5476; Hardeveld, Karloth.

A smaller species than *A. testiculare*, but very similar to seedling specimens of that species. It becomes tufted with age,

93 and has a smaller and more convex capsule than *A. testiculare*.
It has not yet flowered with me. N.E. Brown
(To be continued.)

Mesembryanthemum and some new genera separated from it.
Gard. Chron. III. 71: 105. 1922.
(Continued from page 93.)

105 3. *A. roseatum*, N.E. Br. (Fig. 52). Plant solitary, or perhaps tufted with age? Leaves 2-6 to a plant or growth, but probably in nature only 2-4, with the inner pair sub-erect, united below for nearly half their length and but slightly separated above, with the inner face flat; 4-6 lines long and 3-6 lines broad, broadly ovate, subacute, with sharp edges, and the back very rounded and distinctly keeled at the apical part, which is not prolonged beyond the flat face, about 4-5 lines thick; surface very smooth, white, prettily tinted with rose, especially at the margins and keel. Flower and capsule unknown.

Little Namaqualand: Locality and collector unknown, possibly from the vicinity of Warmbad.

I obtained this distinct and very pretty species from the late Mr. W. J. Doree, but have no other information concerning it. In size and form it somewhat resembles *A. subalbum*, but the rosy tint of its leaves at once distinguishes it from that and all known species.

4. *A. necopinum*, N.E. Br. Plant tufted with age. Leaves 6-10 lines long, 5-8 lines broad at the base, broadly ovate, obtuse, the dorsal apex not or but shortly produced beyond the flat face, obtuse, faintly keeled. Flower sessile between the leaves, with two compressed bracts under it. Calyx 6-lobed; tube obconically campanulate about 2 lines long and 2½ lines in diameter; lobes 1-2 lines long, ovate or oblong, obtuse, green with membranous margins. Corolla 7-8 lines in diameter; petals numerous, in 2-3 series, widely spreading, 3-4 lines long, linear, bright yellow. Stamens very numerous in a dense ring at the top of the calyx-tube. Stigma less than 1 line in diameter.
M. necopinum, N.E. Br. in Journ. Linn. Soc. Bot. v. 45, p. 90.
M. testiculare var. *y*, Haw. Misc. p. 24, and Synop. p. 205. *M. octophyllum* var. *B*, Haw. Rev. p. 85.

Locality unknown. Introduced by Masson, and by Fillans.

** Leaf distinctly much longer than broad, with the edge of the flat face blunt or somewhat rounded and somewhat cartilaginous, and when decaying often becoming redish-tinted.

5. *A. duale*, N.E. Br. Plant tufted with age. Leaves with the flat or slightly convex face 4-10 lines long and 3-6 lines broad at the base, thence tapering to a more or less acute point or narrowly oblong and obtuse, with the dorsal apex sometimes produced shortly beyond it, slightly keeled, up to 2 lines thick. Flowers unknown. *M. duale*, N.E. Br. in Journ. Linn. Soc. Bot. v. 45, p. 89. Van Rhynsdorp Division: on ridges near Pakhuis, Pearson and Fillans, 5487.

This species is very similar to *A. necopinum* in general appearance, but readily distinguished by the blunt, somewhat cartilaginous edges and keel of the leaves. It has not yet flowered with me.

Doubtful Species.

105

Possibly the plant I described as *E. socium* (Journ. Linn. Soc. Bot. vol. 45, p. 91) may belong to the genus *Argyroderma*, but I have not yet seen its flowers, and the skin of the leaves does not seem to be of quite the same texture. It is a small species, quickly forming a tuft, with half-cylindric, suberect leaves 3-10 lines long, 2-4 lines broad, and 2-4 lines thick, obtusely rounded and faintly keeled at the apex, whitish-green tinted with rose when exposed to the sun.

Another plant that may also prove to belong to this genus is *E. octophyllum*, Haw. (Gay., p. 55, excluding the reference to the figure of *E. testiculare* in the Botanical Magazine, t. 1872, and all printing). From Haworth's description of this plant (which is as follows, "Leaves on the living plant 3-8, oblong-ovate, half-terete, more erect than those of *E. testiculare*") it is impossible to form an opinion of it, especially as he quotes the Bot. Mag. figure as belonging to it which is most certainly due to some error, I think probably by Haworth entering the reference by mistake in the wrong place in his manuscript. Fortunately there is a drawing of it preserved at Kew, which is labelled "*E. octophyllum*, Haw. Bot. Mag. 7, 1847. Received in 1843 from A. W. Haworth Esq." This drawing, therefore, represents the typical plant of Haworth, and is all that is really known of it. For the only plant I have ever seen of it was in the rich collection of Mr. W. Wilson Saunders at Reigate, about the year 1866, when Mr. T. Cooper called my attention to it and said it was believed to be a descendant of Haworth's original plant. That plant, to the best of my recollection, was the same as in 1873 I found to be represented in the Kew figure. It is a tufted species, each growth with three or four pairs of smooth, whitish-green or whitish leaves about 7-12 lines long, 3-4 lines broad, and 2½-3½ lines thick at the apex thickened or dilated apically at the base, which is as thick as at the base, flat on the face, very convex on the back, and keeled at the apical part. Flowers sessile and yellow, according to Haworth. Locality unknown. N.E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 71: 129. 1922.

(Continued from page 105.)

Gibbaeum, Haw.

129

Very dwarf-tufted succulent plants, sometimes with short roots. Leaves united into an obliquely ovoid, oblong-ovoid, or sub-cylindric body, with an oblique fissure on one side of it, at or below the middle, resembling a closed or slightly open mouth, formed by the free part of the smaller leaf being closely pressed against or slightly separated from the larger one, with the body often more or less swollen or gibbous below the top of the fissure. Flower solitary, pedicellate, without bracts. Calyx 6-lobed; two of the lobes longer than the others, acutely keeled, and the keel continued down the pedicel. Corolla rather small, petals numerous. Stamens numerous, erect or spreading. Stigmas 6, more or less plumose. Capsule small, 6-valved and 6-celled; valves

129 winged; cells roofed with thin membranous cell-wings and with the outer end of the cell open.

This is another genus proposed by Haworth in 1821 that has remained unnoticed by all subsequent authors. Under his definition of the characters of the section, Gibbos of Mesembryanthemum (Rev. Plant, Succ. p. 104) he remarks: "A good genus, I propose the name Gibbaeum for it." Although in that work he enumerates the species under the genus Mesembryanthemum, Haworth was undoubtedly right in considering that the plants forming his section Gibbosa should be generically separated from that genus, for they are distinguishable from all others included in it at a glance. I have, therefore, compiled the above characters for it, partly from the account given by Haworth, partly from living plant. Unfortunately, I have not yet seen flowers of any species of this genus, as the conditions under which I am obliged to cultivate these plants are not conducive to their flowering, for I am surrounded by houses, and during three winter months, at the very period when under natural conditions, they get the brightest sunshine, no direct sunlight falls upon them, and the glass gets begrimed with falling soot, tending further to decrease the light.

I.

Growths somewhat velvety to the touch from being covered with some kind of pubescence, visible under a lens, quite smooth, silvery-white, greyish-white or greyish, but under cultivation becoming greenish or whitish-green.

1. *G. pubescens*, M.E. Br. (Fig. 64, A, B, and C.) Plant under natural conditions, nearly stemless, with the growths crowded into a tuft upon a woody, shortly-branched rootstock, but under cultivation developing short branches up to 2-3 inches long with age. Growths 1-1½ (or under cultivation up to 1½) inch long, and 5-7 lines thick, or stouter under cultivation, obliquely ovoid or cylindric-ovoid, or, under cultivation, oblong-ovoid, obtusely rounded and often slightly compressed and more or less keeled at the apex, with the fissure usually at or just below the middle of perfectly developed growths, which much resemble a shark's head in appearance, silvery-white or greyish-white, from a dense pubescence of minute simple hairs pointing downwards and closely pressed to the surface, as presented by Fig. 64, C., greatly magnified. Flower not seen, but, according to the description and figure, the calyx-lobes are about 2 lines long, deltoid-ovate, acute, and the petals about 5 lines long, narrowly linear, pale purple. Fruiting pedicels 6-9 lines long, pubescent, with deflexed hairs like the growths; capsule about 3 lines in diameter, 6-valved, whitish.--*G. argenteum*, M.E.Br. in Gard. Chron., 1921, v. 70, p. 273, f. 121. *M. pubescens*, Haw. Obs. p. 138 (1794) and Rev. p. 104; Hees in Gartenflora, 1910, p. 13-14, t. 1579bis; Berger, Mesemb. p. 230 and 229, f. 48; Marloth in Trans. S. Afr. Phil. Soc. v. 18, p. 44.

Ladysmith Div., near Ladysmith, Pillans, Marloth 3300, Pole Evans 6932.

The plant figured and described as *G. argenteum* is so different in appearance from the figure of *G. pubescens* in the Gartenflora, as may be seen by comparing the growths represented by A and B in Fig. 64, that I had no suspicion that they could be the same species until I found upon looking up the literature of this species that both came from the same locality, and then suspected

129 that I had made a mistake. Upon inquiry of Mr. N. S. Pillans, he has given me partial gratification by assuring me that both belong to the same species, different as they appear. For plants of *G. pubescens* that he cultivated near Cape Town (owing to the greater moisture of that region) lost their silvery-white colour and became greenish-white, and produced growths somewhat like those represented by Fig. 64. A, copied from the *Gartenflora*. My own plant has now changed from silvery-white to greenish-white, and is making short branches, so that there can be no doubt of their identity.

2. *G. shandii* N.E. Br. (Fig. 64, D and E).-- Habit and general appearance of the plant almost the same as that of *G. pubescens*, but in the only specimens seen the growths were rather shorter and stouter, being 10-18 lines long and 6-8 lines thick at the basal part, the apical part they are slightly compressed and faintly keeled down the front. The smooth surface is velvety to the touch from being covered with a very minute pubescence of very short irregularly stellately branched hairs that are totally different from those of *G. pubescens*, as represented, highly magnified, in Fig. 64, E, and are only distinguishable under a strong lens, greyish-green or hoary-green, not so silvery as in *G. pubescens*. Flower not seen. Fruiting pedicels 3-4 lines long, compressed, puberulous like the growths at the upper part only. --M. Shandii, N.E. Br. in *Gard. Chron.* 921, v. 70, p. 151, fig. 62, capsule only.

Swellendam Div. Near Sevenfontein, Pole Evans 6921.

I have much pleasure in naming this species after Mr. John Shand, Magistrate of Ladysmith, who is interested in the flora of South Africa, and assisted in the collecting of some of the species of this genus.

Although so similar to *G. pubescens* in general appearance, the character of the minute pubescence is so very different that it is at once distinguished from that species by it, when examined under a lens. I have raised seedlings of both species, and the pubescence on the seedlings of each kind remains distinct and constant, exactly like that of their parents. The peculiar stellately branched hairs of *G. shandii* are not deflexed and not half so long as those of *G. pubescens*.

3. *G. geminum*, N.E. Br. (Fig. 64, F.) --Plant developing prostrate branches 2-3 inches long in the specimen seen, and 1-1½ line thick, with internodes 2½-7½ lines long, bearing a pair or sometimes only one growth at each node. Growths 9-12 lines long and about 3 lines thick, or larger under cultivation, erect, cylindric or slightly compressed at the upper part and more or less keeled on the front and back, obtusely rounded at the apex, which is often slightly incurved with the mouth-like fissure much below the middle, and the body slightly bulging on that side below it, smooth, velvety to the touch, glabrous to the eye, but under a strong lens seen to be covered with a pubescence of very minute branched hairs like those shown in Fig. 64, E. Whitish-green. Flowers unknown. Fruiting pedicels up to 6 lines long. Capsule 2-3 lines in diameter, 6-valved, white; valves winged; cells roofed over by membranous wings, and the outer end of each cell open.

Ladysmith Div. Karoo south-west of Tlouwsberg, Pole Evans 6925.

This singular species is readily distinguished from its allies by the more slender and less conical form of its growths. The pubescence on this species is just the same in character as that upon *G. Shandii*, represented by Fig. 64, E.

N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 71: 151. 1922.

(Continued from page 129.)

II. Growths, Glabrous and Smooth.

4. *G. perviride*, N.E. Br. (Fig. 74.) Plant with age, forming short, branching, woody stems 1-2 inches long and $\frac{1}{2}$ - $\frac{3}{4}$ inch thick, spreading upon or partly buried in the ground; each branch bearing one growth or a small cluster of growths. Each growth $1\frac{1}{2}$ - $1\frac{3}{4}$ inch long, 8-9 lines broad across the two component leaves when resting and closed together, and 6-7 lines thick, with the apical part of the larger leaf more or less compressed, with a slight keel down the front and over the obtusely rounded apex, and the smaller leaf ovate or ovate-oblong, flattish on the inner or upper side, and rounded on the back, deep grass-green, not at all glaucous, shining when in a plump growing condition, and then with the two leaves widely separated. Flowers not seen, described by Haworth as having a "small unequally 6-lobed calyx, as in *M. gibbosum*," and a corolla "a little larger and paler than in *M. gibbosum*. Petals uniformly red, very obtuse. Stamens short, spreading, with white filaments and yellowish anthers. Styles 3, very spreading, as long as the filaments, with subulate subvillose recurved tips." *M. perviride*, Haw. Ob. Mesemb., p. 136 and 451 (1794) and Misc. Nat., p. 37.

South Africa. Locality unknown, introduced in 1792; collector not stated.

Var. *luteoviride*, N.E. Br. Leaves larger and longer than those of the type, yellowish-green. "Calyx 2-edged at the base, 6-lobed, the outer lobes larger than the others, obtuse, rounded, the inner lobes flattish, subulate, obtuse, with yellowish, subulate tips. Corolla almost as in *M. perviride*; petals numerous, spreading imbricate at the base, rather broad or cuneate-linear, often notched, pale reddish, with a darker mid-line, whitish at the sides at the base. Stamens nearly three times as short as the petals, spreading, white, with sulphur-coloured anthers. Styles 6, strongly plumose, at length spreading, and very short and subulate tips. Stamens." *M. perviride*, var. *luteoviride*, Misc. Nat., p. 37 (1794). *M. luteoviride*, Haw. Synop., p. 226 (1812).

South Africa. Locality and collector unknown; introduced about 1795.

Although I have cultivated *G. perviride* for many years, it has never attempted to flower. The variety *luteoviride* I have never seen.

5. *G. gibbosum*. N.E. Br. Stem of old plants 1 inch long, densely furnished with very short, alternate, prostrate branches. Leaves variable, expanding, scarcely two of equal size on the whole plant, one of each pair always larger, longer and more gibbous than the other on the back, few of them more than 1 inch

151 lance, very thick, united at the base, all more or less blunt, compressed and gibbous on the back, dullish glaucous - green. In the other place they are described as "one short and gibbous, the other much enlarged and oblique at the apex, spreading, ovate, semicylindric, rarely keeled at the apex, yellowish-green." Pedicel very short, compressed, 2-edged or almost winged. Calyx unequally 6-lobed; 4 lobes flattish, with more or less membranous sides; 2 larger, with an acute keel recurvant upon the pedicel. Corolla small, about half an inch in diameter. Petals linear, reddish, with paler margins; stamens numerous, short, convergent; anthers yellowish-white. Styles 6, erect, very short, greenish-yellow. *M. gibbosum*, Haw. Obs. Resemb., pp. 137 and 451 (1794).

South Africa. Locality unknown.

The above description is compiled from that of Haworth, and represents all that is known of this species, for no plant at present in cultivation that is known to me corresponds to the above characters. But I have a plant, collected near Latjesfontein, and sent to me by Dr. J. E. Brown under no. 101, that I strongly suspect to be *G. gibbosum*. It is reproduced in Fig. 75, and consists of a number of growths crowded upon a very shortly branched woody rootstock, forming a hemispheric clump about 1 inch in diameter. Each growth is $1\frac{1}{2}$ - $1\frac{3}{4}$ inches long and 7-8 lines thick at the lower part, stoutly conical-ovoid, tapering from about the middle into a conical obtuse point, slightly keeled down the front, with the smaller leaf (measuring from the base of the fissure) about half as long as the larger one; at first they are closely pressed together, afterwards more or less separating, smooth, quite glabrous, of a light and somewhat yellowish-green at the basal part, suffused with purple on the upper part, and with a faint glaucous tint. I have not seen a flower of it. If this proves to be Haworth's *M. gibbosum*, then Fig. 75 will represent its appearance as it grows under natural conditions.

N. E. Brown

(To be continued.)

Reproduced from the original in the Botanical Magazine, London, 1922.

Card. Chron. III. 71: 198. 1922.

(Continued from page 151.)

Conophytum, N. E. Br.

198 Very small succulent plants, stemless or developing stems with age, with several or numerous growths in a clump. Roots very short. Each growth formed of two leaves fused into one fleshy body, globose, obconical, ovoid, subcylindric or oblong in shape, convex, flat, depressed, notched or two-lobed at the top, with a small orifice resembling a closed mouth at the centre of the top or between the lobes. Flower solitary, growing up from the interior of the growth through the central orifice. Calyx with a distinct slender membranous tube above the ovary, 4-6-lobed at the top, more or less included in or partly or entirely exerted from the body of the growth. Corolla with a distinct slender tube as long as or longer than the calyx-tube; petals numerous or occasionally few, spreading or recurved, in one to several series, the inner series at the mouth of the tube sometimes much smaller than the others and differently coloured. Stamens few or many, erect, not collected into a column, included in the corolla-tube or partly exerted from it. Ovary flat or convex at the top, with a marginal,

198 crenulate, glandular ring, 4-6-celled. Style long or short (rarely almost absent), with 4-6-filiform stigmas at its apex. Carsule small, 4-6-valved, 4-6-celled, with or without cell-wings covering the seeds.

The generic name is formed from the Greek words konos, a cone, and phyton, a plant, in allusion to the form of the growths, which in many species resemble an inverted cone in shape. I have adopted this name from Haworth's suggestion in his *Revisiones Plantarum Succulentarum*, p. 82, where, under his Section *Conium*, he writes, "If this section proves to be a genus the name *Conophyton* would be apt." But he does not himself actually propose to consider it generically distinct from *Mesembryanthemum*, as he does in the case of *Clottia*. I have, therefore, accepted his suggestion for a generic name for them by modifying it into the Latin form.

The plants included in this genus are all distinguishable at sight from *Mesembryanthemum* by their form, and technically by their calyx and corolla, each having a distinct tube, by the presence of a distinct style (in two or three species, however, this is almost absent), and by their peculiar mode of growth in both the seedling and adult stage, being, together with those of the genus *Lithops*, the only known plants that are almost alike in form in both the cotyledonary and adult stages, the only practical difference between the two stages being that of size, as I have described, and illustrated in the *Gardeners' Chronicle*, 1921, vol. LXX. p. 207, fig. LXXIV., M-O, and p. 223, fig. 97.

A peculiarity of these plants is (as stated in vol. LXX, p. 290) that they have very short roots, rarely more than about an inch or an inch and a half long, and they often grow in a very shallow layer of soil (from half an inch to one inch thick) that has accumulated upon the surface on crevices of rocks. How they manage to exist in the dry, hot climate of South Africa in such situations is a mystery that cannot be solved in Europe.

The plants of this genus, together with those of the genus *Lithops*, are popularly known as the "Sphaeroid *Mesembryanthemums*," and of this group in the most recent monograph of the genus *Mesembryanthemum*, published by Berger in 1908, only 17 species are enumerated, of which he appears to have seen only six, yet at that date I had at least thirty species in cultivation. In the following enumeration 58 species are described, so that with the addition of the ten species of *Lithops* already described, the number of Sphaeroids at present known amounts to 68, and I have a few others that I expect to be new species that have not yet flowered. Over a hundred years ago Haworth (*Synopsis*, p. 236) records that he asked Lessou (who introduced a vast number of these plants) if he had sent home all the species there were "No, nor half of them." And I very much doubt at this period if half the species of Sphaeroids have yet been discovered.

During my botanical career I have worked at a large number of genera of plants, and have generally been able to make some sort of key to the species, but this genus *Conophyton* defies all my efforts, for there are so few characters to make use of that can be defined by words. These plants do not possess the evident parts that other plants have; no stem, no leaves, no angles, no stipules, no prickles or spines from which differentiating char-

198 198 acters can be derived, only an obconic, globose, obcordate or two-lobed fleshy mass and a flower. And as the size of the growths of the very same plant in different years under cultivation difference in colour and markings, and perhaps every slight difference in form by which to distinguish different closely allied species when out of flower; and these are not characters that can be clearly defined by words, and are sometimes variable. The flowers often differ likewise in small but constant characters that cannot be described, for colour cannot always be relied upon to separate allied species, since different plants of the same species may vary from white to rosy in the colour of their flowers. Haworth and others have thought that the exertion of the ovary from the body of the growth or its inclusion within it is a good specific character, but I find it the exertion or inclusion of the ovary and calyx-tube varies in different years upon the very same plant, so that it cannot be implicitly relied upon. Therefore, only good coloured drawings with dissections accompanying the descriptions can really enable anyone to correctly discriminate between the closely allied species of this genus, and such illustrations I have been for some years preparing for a future work. Meanwhile, I have done the best I can to classify the species by grouping them in accordance with the character of their surface, form and markings.

There is one point that it is very important to note, and that is the difference in size and appearance between newly imported plants and those very same plants after being in cultivation a few years. The habitus of different species is still very variable, however; some do not alter at all, while others alter greatly. For example, the growths of the beautiful little *C. minusculum* are no larger to-day, after 13 years cultivation, than they were when first sent to Kew in 1908, while the growths of *C. globosum*, when introduced at Kew, were about half an inch in diameter, yet a portion of the plant given to myself developed in two years growths 1-1½ inch in diameter, and in subsequent years varied from 1-1½ inch in diameter, a size that it probably never attains in nature. The most remarkable change that I have noticed has been in the case of the very distinct *C. pilosulum*, which has altered its form from obcordately obovoid to an elongated ovoid shape, pointed at the top.

M.E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Charon. III. 11: 111. 1911.

(Continued from page 198.)

In the descriptions which follow it will always be necessary to take the smaller dimensions given as more nearly indicating the size of the growths as they occur in South Africa. The time at which the flowers are stated to expand is Greenwich time, not the so-called "summer-time."

As in the case of the genera previously dealt with, the name *Mesembryanthemum* is indicated by the letter M in the synonymy.

The groups under which I have arranged the species in most cases are purely artificial, and do not admit of a proper sequence of the nearest allied species.

In the descriptions the breadth of the growths is the greater diameter, and the thickness the lesser diameter across the top.

CONOPHYTUM.

Key to the Groups.

214 I. Growths globose, ovoid, obovoid, obconic, obcordate, or rarely subcylindric, not compresses as if pinched between the finger and thumb and two-lobed at the top. Types A to G of Fig. 112. Species 1-49.

Surface pubescent, minutely puberulous or covered with minute points scarcely amounting to hairs, as viewed with a lens.

A, Species 1-5.

Surface glabrous except at the minutely puberulous orifice. *C. oviforme* is minutely tuberculate all over, and a few species have raised dots, all the others are quite smooth.

AA, Species 6-49.

Growths uniformly green or more or less tinted with purple, without dots or markings, except sometimes in 8, *C. jucundum*; 11, *C. Wettsteinii*; 12, *C. minutum*; 14, *C. saxetanum*; and 15, *C. viridicatum* (see also 18, *C. translucens*).

B, Species 6-15.

Flowers yellow

C, Species 6-7

Flowers of some shade of red or perhaps whitish in 14, *C. saxetanum*,. Colour unknown in 10, *C. subrisum*.

CC, Species 8-14.

Flowers white (see also 14, *C. saxetanum*, and 18, *C. translucens*).

CCC, Species 15.

Growths marked with dots or lines.

BB, Species 16-49

Dots all scattered and separate (see also 11, *C. saxetanum*; 27, *C. Nevillei*; and 30, *C. parvipetalum*).

D, Species 16-22.

Some or all of the dots confluent into lines or the growths marked with lines not formed of confluent dots.

DD, Species 23-49.

Top of the growths flattish or with a broad and shallow, trough-like transverse depression, or slightly excavated and shallowly cup-shaped (see also 33, *C. leviculum*, and 37, *C. signatum*).

E, Species 23-31.

Top of the growths more or less convex (flattish in species 33 and 37), or convex on each side of the central notch, which does not spread out over the whole of the top as in some of those under E.

EE, Species 32-44.

Top of the growths obcordate, with or without a slight ridge or keel extending from the orifice to the top of the convex lobule on each side of it. Types O-" of Fig. 112.

EEE, Species 45-49.

II. Growths two-lobed at the top, and the lobes or top of the growth compressed and keeled as if pinched between the finger and thumb, with flat sides to the notch separating the lobes, except in 57, *C. turrigerum*, which has cylindric lobes, convex or subtruncate at the top. Types R to T of Fig. 112.

Surface covered with minute points viewed with a lens, slightly and harshly puberulous to the touch.

F, Species 50-51.

Surface quite glabrous, smooth to the touch.

FF, Species 52-57.

I.

Growths globose, ovoid, obovoid or obconic in form, circular, elliptic, or rarely slightly angular on outline, viewed from above, and not compressed as if pinched between the finger and thumb at the upper part, with the top convex, flat, depressed, obcordately notched so as to form two very short and broadly-rounded lobes, or with a broad V-shaped trough extending from margin to margin all across the top, as represented in the outlines Fig. 112.

Types A-Q (Species 1-49).

A.

Surface either distinctly pubescent or (as seen under a lens) minutely puberulous or covered with minute points scarcely amounting to hairs. (Species 1-5.)

1. *C. pilosulum*, N.E. Br. Growths obcordately obovoid (type N) in nature, but under cultivation with me becoming elongated-ovoid and more or less pointed at the top (type B), $\frac{1}{2}$ -1 in. in diameter, softly pubescent with fine outstanding hairs, dull purple were exposed to the sun, uniformly light green on other parts, without spots or markings. Flowers not seen, but according to a photograph the flower is about eight lines in diameter with about thirty recurved-spreading petals, and stated to be bright purple. *C. pilosulum*, N.E.Br. in Journ. Linn. Soc. Bot., Vol. 45, p. 98. Ladysmith Div. near Tlouwsberg Mountains, in a clayey subsoil covered with sand, flowering in May, Fole Evens, 6927.

2. *C. Leipoldtii*, N.E.Br. (Fig. 112). Growths globose (type C), about a quarter of an inch in diameter, covered with an adpressed pubescence of fine hairs all pointing downwards, pale brownish, tinted with reddish, not dotted. Flower not seen, stated to be magenta and not to close when once expanded until it withers.

Clanwilliam Div., near Clanwilliam, Leipoldt. I have much pleasure in naming this very distinct species after Dr. C. L. Leipoldt, who has discovered a considerable number of interesting South African plants. The flower is probably usually more symmetrical than represented in the figure, which is from a photograph sent to me by Mr. Leslie.

3. *C. fibuliforme*, H.E. Br. Growths obconic, flattened at the top, slightly pubescent, whitish or hoary, without spots. Flowers unknown. *C. fibuliforme*, Haw, Misc. bot., p. 22 (1803), and Rev. Fl. Succ., p. 83.

Locality unknown. Introduced by Masson in 1795, but soon dies out of cultivation, and does not appear to have been rediscovered.

Haworth states that it is of the size of *C. truncatellum* and resembles that species in form, but is more depressed and more evenly truncated. The description given by Sonder (Fl. Cap., Vol. 2, p. 393) is evidently partly based upon Haworth's description and partly upon a plant collected by Zeyher it is certainly a mixed description of two species, and must, therefore, be discredited. The above account contains all that is known of the plant at present.

4. *C. fimbriatum*, H.E.Br. Growths obconic, apparently flat-tish or slightly convex on the top, minutely puberulous. Calyx five-lobed, gland-dotted. Corolla with lobes about 1½ line long, and narrowly linear acute petals about 2½ line long, marked (in the dried state) with numerous linear impressed lines to their entire length. Style short, with five filiform stigmas, gland-dotted like the petals.-- *C. fimbriatum*, Sond. in Fl. Cap., Vol. 2, p. 393.

Near the Gembke River in either Beaufort West Div. or Prince Alber Div., Burke, Zeyher 693.

The gland-dotted flowers distinguish this from every other species known to me. Sonder describes the species as being different from specimens collected by Zeyher. I have not seen Zeyher's specimens, from which Sonder described, but as Burke and Zeyher travelled together, and in most cases collected the same species, the specimens collected by Zeyher are probably identical with those of Zeyher, and are decidedly minutely puberulous, as in Zeyher 693, which Sonder wrongly quotes as being *C. minutum* Haw.

5. *C. pisinum*, H. E. Br. Growths obconic or subglobose, slightly lined in the center, covered on the top (type E), all over velvety to the touch from being covered with very minute points, scarcely amounting to pubescence, only visible under a lens and best seen on the old withered sheaths, of a slightly greyish-green, often more or less tinged with purple on the sides, and inconspicuously marked with scattered dots on the top. Flowers unknown.

Locality unknown. Maroo, Marloth.

C. pisinum, H.E. Br. in Journ. Linn. Soc. Bot., v. 45, p. 98.

AA.

Surface glabrous, except at the orifice, which is usually minutely puberulous, minutely tuberculate all over in *C. oviforme*, and in a few species with the dots raised and tumour-like, but in the others quite smooth. (Species 5-49.)

B.

Growths uniformly green, or green with the sides or sometimes the top or around the orifice purple, usually without dots or markings, but in *C. jucundum*, *C. minutum*, *C. saxetanum*, *C. viridicatum* and *C. Wettsteinii* there are sometimes a few indistinct dots on

214 different plant or even on the same plant in different years.
(Species 6-15.) N. E. Brown
(To be continued.)

Mesembryanthemum and some new genera separated from it.
Gard. Chron. III. 71: 251. 1922.
(Continued from page 214.)

231 C . Flower yellow.

6. *C. calculus*, N. E. Br. Growths globose (type D), 7-10 lines in diameter, light greenish-yellow or ochraceous; the withered skin is very tough and of a pale brown, becoming blackish-brown with age. Corolla 1-1.5 lines long, expanding at night, closed during the day; tube 3-4 lines long; petals 40-50 in 3-4 series, 3-4 lines long; filiform-linear, yellow. Stamens inserted about 1 line from the corolla-tube, whitish, with yellow anthers. Top of the ovary dome-like. Style very short; stigmas 6, filiform, greenish.-- *C. calculus*, Berger, Mesemb. n. 289 (1908), Marloth, Fl. South Afr., v. 1, p. 201, t. 49, f. B.

Van Rhynsdorp Div. Near Nieuwerust, Pearson 5515; near Bakhuis, Pearson 5471; Hardeveld, Marloth 4573; Mrs. Rood.

7. *C. ...*, N. E. Br. ... 7 lines in diameter, ... (type ...), ... sometimes slightly ... (in the ... plant) uniformly bright green, at others bright apple-green, with the sides and around the orifice of a rich purple. Flowers not seen, but figured in a drawing as being 4-6 lines in diameter and yellow, with the tips of the petals tinted with red.-- *C. ...*, N.E.Br. in Journ. Linn. Soc. Bot., v. 45, p. 96.

Little Namaqualand. Near Garies, Durke,.

... ent years under cultivation (at least with me) it is very remarkable. When the rich purple colouring around the orifice is present it is an exceedingly attractive plant, yet sometimes this is entirely absent; for example, in 1919 and 1920 the purple was present on my plant, yet during the hot sunny year of 1921 it was entirely absent on the very same plants.

CC. Flower of some shade of red, or ... sacetanum, colour unknown in *C. subrisum*. (C. ... -1.)

8. *C. globosum*, N.E. Br. (F. ...). plants originally globose and about 1-1.5 lines in diameter (type ...), becoming under cultivation slightly globose-obcordate (type ...), and sometimes 1-1.5 inch in diameter, of a slightly bluish-green colour. Corolla of a slightly bluish-green colour. Corolla 1-1 inch in diameter, expanding in the morning, closing in the afternoon, scentless, funnel-shaped, with 40-50 petals in 3 series, white at the lower part and light pink at the apical part. Anthers yellow. Style 3-5 lines long, slender, with 4 filiform stigmas. -- *C. globosum*, N.E. Br. in Kew Bull., 1913, p. 119. *Lycoperdium ...* Fl. n. 22, t. 10, t. 2. probably belongs here.

Little Namaqualand. Near Garies, Pearson 5532, Fillans.

9. *C. jucundum*, N. E. Br. Plant forming branching stems with age. Growths near-shaped in side view (type D), subglobose seen from above, glaucous-green, occasionally with a few dots of darker green when young, which disappear with age. Calyx 3-4-lobed, Corolla 8-11 lines in diameter, opening in the daytime; tube 4-5 lines long, apricot-coloured, petals 20-40 in 2-3 series, bright rosy-magenta. Anthers yellow. Style 4-5 lines long; stigmas 4-5, about 1 line long, greenish, equalling or exceeding the stamens.-- *C. jucundum*, N.E. Br. in Journ. Linn. Soc. Bot., v. 45, p. 93.

Little Hamsqualand. South of Bethany Drift, Pearson 6067.

The formation of stems with age is a marked character of this and the next species. Under cultivation the stems of *C. jucundum* spread over the ground, but under natural conditions are probably buried under drifting sand.

10. *C. subrisum*, N. E. Br. Plant developing branching stems with age. Growths 9-12 lines long, 7-8 lines in diameter, obconic, truncate at the top (type I), with the orifice depressed and so somewhat resembling a smiling mouth, with a small dimple at each end, uniformly whitish-green. Flowers unknown.-- *C. subrisum*, N.E. Br. in Journ. Linn. Soc. Bot., vol. 45, p. 100.

Van Rhynsdorp Div. Near Attys, Pearson 5466.

Of this very rare species a single plant was sent to Kew in 1911 by Prof. H.E. Pearson, which under cultivation increases very slowly. It is readily recognised by its habit of forming stems, and the resemblance of the depressed orifice to a smiling mouth.

11. *C. Wettsteinii*, N.E.Br. Growths 6-10 lines long, 6-15 lines in diameter, very broadly obconic, with the flat circular top often overhanging the sides (type H.), uniformly light bluish-green or rarely with a few scattered darker green dots. Calyx 3-5 lobed, whitish or pale reddish. Corolla 8-11 lines in diameter, remaining open irrespective of cloud or sunshine, scentless; tube longer than the calyx, dull orange-pink; petals of two kinds, the outer 17-38 in two series, widely spreading, bright rich magenta, becoming white at the base, shining; the inner erect at the mouth of the tube, 1½-2 lines long, linear-filiform, very acute, yellow or orange. Stamens all included in the corolla-tube below the inner petals. Style ½-1 line long; stigmas 4, erect, minute, about ½ line long.-- *C. Wettsteinii*, Berger, *Wesemb.* p. 285 and 288, fig. II. (1908). *C. truncatellum*, Othner in *Gartenwelt*, 1907 vol. 11, p. 301, with fig. not of Kew.

Van Rhynsdorp Div. Near Bakhuis, Pearson 5,469.

12. *C. minutum*, N.E.Br. (Fig. 122). Growths forming short branching stems with age, clothed with old sheaths; each growth about 5-6 lines long and 2½-5 lines in diameter, obconic or sub-globose-obconic, slightly convex at the top (type E.), with the orifice in a slight central depression, light bluish-green or somewhat glaucous-green, with or without a few inconspicuous scattered darker green dots. Calyx 4-lobed, whitish. Corolla 6-11 lines in diameter, expanding in the daytime irrespective of cloud or sunshine, scentless; tube slender, dull orange, sometimes pale yellowish-white; petals of two kinds, the outer 3-5 lines long, widely spreading or recurved, bright rosy-magenta, shining, and the inner 1-1½ line long, ascending or spreading from the mouth of the tube, yellow, or some with magenta tips. Stamens

231 included in the corolla-tube and hid from view by the inner petals. Style $\frac{1}{2}$ -1 line long; stigmas 4, up to $\frac{1}{2}$ line long, greenish. *M. minutum*, Haw, Misc. Nat., p. 21 (1805); Bot. Mag., t. 1376; Berger, Mesemb., p. 285 and 288, f. 65, I., copied from the Bot. Mag. *M. thecatum*, N.E. Br. in Bot. Mag., t. 8595 A.

Van Rhynsdorp Div. Near Bakhuis, Pearson 5470, Fillans. Introduced by Masson in 1795.

When I described *M. thecatum* I considered it to be distinct from *M. minutum*, because the tube of the corolla was not exerted from the calyx, in the manner represented in the figure of *M. minutum*, and in the case of the latter, the formation of sheath-clad stems is neither represented nor described; but my plants of *M. thecatum* have now produced flowers with a corolla-tube nearly or quite as long and as much exerted from the calyx as is represented in the Botanical Magazine, and when the plant is more deeply set in the soil the stem-formation is not evident. Other characters being apparently the same, I have now no doubt that *M. thecatum* is identical with *M. minutum*. The extent of the exertion of the corolla-tube probably depends upon the temperature and amount of moisture received during the formation of the flower, as I have found a variation of these conditions to produce similar results in other species.

13. *C. oviforme*, N.E.Br. (Fig. 123). Growths subcylindric-ovoid or narrowly obovoid, 4-6 lines long and 2-3 $\frac{1}{2}$ lines thick, very convex at the top (type A.), grass-green, minutely tuberculate or papillate all over, soft and pulpy, often enclosed in their old whitish or pale brownish skins. Calyx 6-7-lobed, included, or only the tips of the lobes exerted from the old skin. Corolla about 7 lines in diameter; petals about 30, stated to be pale magenta, but not seen in a fresh state. Style none; stigmas 6, about $\frac{1}{2}$ line long, filiform. Capsule 2-3 lines in diameter, 6-valved, 6-celled, with small cell-wings, and broad marginal valve-wings.--*M. oviforme*, N.E. Br. in Journ. Linn. Soc. Bot., v. 45, p. 95; and in Gard. Chron., vol. LXXI., p. 207, fig. 84, I-L.

Van. Rhynsdorp Div. Hardeveld, Harloth; Mrs. Rood, 655.

I think it quite probable that the flowers of this species are sometimes white. The minute papilla-like tubercles on this plant readily distinguish it from all other species.

H. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 71: 261. 1922.

(Continued from page 231.)

14. --*C. saxetanum*, N. E. Br. Plant forming very dense hemispherical tufts of very small growths, each about 4-6 lines long and 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ lines thick, cylindric or cylindric-clavate, very convex at the apex (type A.), with a minute and very inconspicuous orifice, green, more or less tinted with purple where exposed to the sun, with or without a few inconspicuous darker green dots around the orifice. Often the growths are more or less included in their old skins. Flowers not seen alive, but on one dried specimen it appeared to be rosy, Dr. Harloth, however, states that it is "whitish or cream-coloured." possibly it varies.--*M. saxetanum*, N. E. Br. in Journ. Linn. Soc. Bot. v. 45, p. 99.

261 *M. fimbriatum*, Marloth in Trans. Roy. Soc. S. Afr., v. I., p. 406, not of Sonder.

Great Marlothia. In flower at Kew (4676 ex Marloth), Pole Evans, flowering in May, Marloth, 4676, at Kew (4676 ex Marloth), Pole Evans.

Some of the native tufts of this species must be very old, as upon counting the number of sheaths upon a short measured length of one of the stems this species forms, I found that at a rough estimate that particular plant was at least one hundred years old. The growths form only one sheath each year under natural conditions.

CCC. Flower white, also see 14, *C. saxetanum*, and 18, *C. translucens*.

15. *C. viridicatum*, H.E.Br. Growths 6-10 lines long and 5-8 lines in their greater diameter, obconic, with a shallow groove-like depression across the elliptic slightly convex or flattish top (type F., but with a deeper notch), and often with a faint obtuse ridge on each side of the orifice, uniformly green, like young Apples, without markings, or (on the same plant in different years) with some very small inconspicuous darker green dots. Calyx 5-lobed, whitish. Corolla, about 9 lines in diameter, opening after sunset, scentless, with about 25 narrow spreading very narrow white petals. Stamens exserted; anthers yellow. Style very short; stigmas not attaining to the mouth of the corolla-tube.-- *C. viridicatum*, H.E.Br., in Journ. Linn. Soc. Bot., v. 45, p. 101.

South Africa. Locality and collector unknown.

BB.

Growths more or less marked with dots or lines (species 16-49). See also a few species mentioned under B.

D.

Dots allscattered and separate (species 16-22.) See also species noted under B, and 27 *C. Nevillei*, and 30 *C. parvipetalum*.

16. *C. albertense*, H. E. Br. Growths 4-7 lines in diameter, at the circular or broadly elliptic, slightly convex top (type E), Corolla 6-7 lines in diameter, opening late in the afternoon, scentless; petals 25-28, straw-yellow. Anthers all shortly exserted. Style very short; stigmas not attaining to the mouth of the corolla-tube.-- *C. albertense*, H. E. Br., in Journ. Linn. Soc. Bot., v. 45, p. 92. Sent to Kew by the late Prof. H. H. W. Pearson, as having been collected near Prince Albert, but as I have been told it appears to be the same plant sent to me by Mr. H. S. Pillans from near Prince Albert Road, the latter locality may have been intended.

17. *C. fraternum*, H. E. Br. (Fig. 138). Growths 4-7 lines long and 3-5 lines in diameter, obconic, flattish at the top, with the centre often slightly depressed (somewhat as in type J), pale greyish-green, with scattered dark green or finally purplish dots. Calyx usually exserted, 4-lobed, whitish or pale greenish, sometimes tinted with purple. Corolla 4-10 lines in diameter, opening in the morning and closing towards evening, scentless; tube very much longer than the calyx, dull

261 ochreous-yellow or whitish; petals pale pink, fading into yellow at the mouth of the tube, or entirely white. Stamens with orange filaments and yellow anthers. Style as long as or longer than the stamens, filiform, with 4 minute stigmas orange-red or light yellow.--*M. fraternum*, N.E.Br., in Kew Bull., 1913, p. 118.
Little Namaqualand. Hills south-west of Chubiesiss, Pearson, 1177.

18. *C. translucens*, N. E. Br. Growths 3-6 lines long and 3-5 lines in their greater diameter, obconic, slightly convex at the top (type 1), scarcely, or but slightly depressed at the orifice, "translucent green, with slightly darker distinct spots only showing under a lens, and a few yellowish dots, not confluent. Flowers open at night and wilted." Calyx-tube much exserted, 2-3 lines long, 5-lobed. Corolla about half an inch in diameter; tube not exserted from the calyx; petals numerous, widely spreading, creamy-white. Anthers exserted, yellow.

Locality unknown, N.E.Br., 1, 187. This is evidently a very distinct species, but it only came to me from a coloured painting made by Miss Page, and sent to me by Mrs. L. Bolus. The translucent green colouring is unlike anything I have seen.

19. *C. piluliforme*, N. E. Br. Growths very small, $1\frac{1}{2}$ -3 lines in diameter, obconic, convex on the top (type 1, but very small), different plants varying from dull greyish-green to dingy purplish or purplish-green, marked with a few scattered dark purple or dark green dots, and often a line of confluent dots, transverse to the orifice, the orifice outlined with the same colour. Calyx 4-lobed, dull dark red. Corolla insignificant, night flowering, scentless (but stated to be slightly scented in S. Africa), about 4 lines in diameter, with 13-20 lax, irregularly arranged, very narrow petals of a peculiar reddish-ochreous colour or dull coppery red. Anthers yellow, all shortly exserted. Style about half as long as the tube of the corolla, with 4 filiform stigmas rising to the base of the anthers, reddish. Top of the ovary dome-shaped.--*M. piluliforme*, N. E. Br., in Journ. Linn. Soc., Bot., v. 45, p. 98.

Robertson Div. Near Montecul. Collector unknown.

20. *C. cratum*, N. E. Br. (Fig. 139). Growths somewhat top-shaped in side view, globose viewed from above, convex at the top, with a broad and shallow V-shaped notch across it, pale bluish-green, sprinkled with dark green dots, and the orifice outlined with dark green, very conspicuous on the young growth, but becoming fainter with age, and later a dark pink dot appears on each side of the orifice. Calyx usually exserted, 4-5-lobed, whitish. Corolla 6-7 lines in diameter, expanding in the daytime, irrespective of sunshine; tube 3-4 lines long; petals 28-32 strongly recurved, rich magenta, shining. Stamens about 35-40, in 1-2 series, shortly exserted, yellow. Style 4-5 stigmas about one line long, dull yellow, finally exceeding the stamens.--*M. cratum*, N.E.Br., in Journ. Linn. Soc. Bot., v. 45, p. 98.
M. nanum, J. Bolus in, Ann. S.-fr. Mus., v. 9, p. 141, not of Schlechter.

Little Namaqualand. Barren slopes north of Dounabis, Pearson, 3073.

21. *C. truncatum*, N. E. Br. Plant with age forming a dense

261 tuft of crowded stems up to 1 inch long, densely covered with the remains of old sheaths, firm in substance and of a tan-brown colour. Each branch terminated by an obconic growth about 4 lines long and 3-4 lines in diameter, scarcely or but slightly exceeding the old sheath, apparently flattish or slightly convex on the top, and of a light brown colour in the dried state, but Thunberg describes them as being subtruncate and subretuse-truncate, green and dotted, and as having a 4-lobed calyx of perianth. But the specimen is in fruit only, and I see no trace of calyx-lobes, although as it is 5-angled it was doubtless 5-lobed. The capsule is just exerted from the orifice so as to rest on the top of the growth, and is distinctly 5-valved, and about 2½ lines in diameter.--- *C. truncatum*, Thunb., in Acad. Caesar. Leon. Carol. Nat. Curios. Gphen., v. 8, Append. p. 5 (1791), and Fl. Cap., p. 412, not of other authors.

Uniondale Div. Among rocks in Mannassie Karoo.

The above description is made from Thunberg's type specimens, which I have had the privilege of examining. This species has never been introduced into cultivation, although the name has been erroneously applied to various cultivated plants.

22. *C. truncatellum*, N. E. Br. (Fig. 140). Growths 8-10 lines high and 6-12 lines in diameter, very broadly obconic, circular in outline at the top, which is flat or more usually shallowly depressed at the centre (type J), with a slight but usually distinct blunt ridge on each side of the orifice, light glaucous-green, sprinkled

262 all over the top with small dark green dots, sometimes mingled with purple dots, calyx exerted or included, 5-lobed. Corolla 7-8 lines in diameter, opening at about 5 p.m., closed during the day, delicately scented; tube 2-5 lines long; petals 30-50, recurved-spreading, very narrow, pale straw-coloured or light yellow. Stamens numerous, in 2 series; anthers yellow. Style 1-1½ line long; stigmas 5-6, about 1-1½ line long, attaining to about half the length of the corolla-tube, pale greenish.--- *C. truncatellum*, Haw. Misc. Nat., p. 22 (1803).

Locality unknown. Introduced by Masson in 1795.

C. truncatellum

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 71: 307. 1922.

(Continued from page 262.)

307

DD.

Some or all of the dots confluent or connected into lines, or the growths marked with lines not formed of dots, often forming a sort of pattern. (Species 23-49). See also 19 *C. piluliforme*.

E.

Top of the growths flattish, or with a shallow, trough-like transverse depression nearly as broad as the top, or slightly excavated and shallowly cup-shaped. (Species 23-31). See also 33 *C. leviculum*, and 27 *C. signatum*.

23. *C. minimum*, N. E. Br. Growths very small, about six lines high obconic, truncate with each side rising a little higher

307 then the middle, causing them to appear as if transversely channelled, with a scarcely perceptible central puberulous orifice, smooth, somewhat glaucous-green, marked with several single and confluent spots, forming somewhat branches lines. Flower small, calyx 5-lobed, cylindric, membranous, at length campanulate, prettily spotted with red. Ovary exserted above the top of the plant. Petals whitish-yellow or whitish.--*C. minimum*, Haw., Obs. -esemb. p. 126 and 131, under *C. nuciforme*, and 450 (1795), and Misc. Nat. n. 21.

Locality unknown. Introduced by Masson before 1776.

This has long been lost to cultivation, and I have not seen any species that will agree with Worth's description as above given.

24. *C. verrusillum*, W. E. Br. "Differs only from *C. minimum* by its included ovary, and a little in its numerous offsets spots. Ovary included."--*C. verrusillum*, Haw., Rev. 11. Succ., n. 22 (1821).

Locality unknown.

This species is also quite unknown to me. But there are at least three species in cultivation under the name *C. verrusillum*, neither of which in any way agree with Worth's description of it. Possibly *C. verrusillum* is not specifically distinct from *C. minimum*, but this cannot be decided until the plants are discovered.

25. *C. praecinctum*, W. E. Br. Growths 4-5 lines long, 3-4 lines broad and 2-3 lines thick at the flattish top, which is elliptic-oblong in outline and not depressed at the orifice; the sides are purple, and the top greyish-green, often tinged with purple, marked with a dark purple (or probably sometimes dark green) ring formed of confluent dots parallel with and inside the margin, and a very few scattered dots of the same colour. Calyx-tube exserted, 4-lobed; ovary included. Corolla 5-6 lines in diameter, expanding in the evening, scented; tube 2½-3 lines long, about as long as the calyx; petals 16-20, recurved-spread, cream-coloured. Stamens scarcely exserted, whitish. Style about ½ line long; stigmas 4, nearly 1 line long.

Locality unknown. Bolus, 15933.

This species is unknown to me, I have described it from an excellent coloured drawing made by Miss M. Page from a living plant, which I understand is now dead.

26. *C. obmetale*, W. E. Br. Growths 1-1½ lines long, 7 lines in diameter, obconic, nearly circular in outline at the nearly-flat top (type F), greyish-green or dull green, marked with very distinct dull purplish-brown or dark green branching lines formed of confluent dots, with a few separate dots scattered among them. Calyx 4-lobed. Corolla 5-5½ lines in diameter, opening about sunset, closed during the day, scentless; tube about as long as the calyx; petals 16-20, recurved-spread, milk-white, very shining. Stamens 12-25, in two series, the upper anthers just exserted, yellow. Style about one line long; stigmas 4, plumose-filiform, 1½ lines long, whitish or yellowish-green.--*C. obmetale*, W. E. Br. in Journ. Linn. Soc. Bot., Vol. 45, p. 95. (1920).

South Africa. Locality and collector unknown.

27. *C. Nevillei*, N.E.Br. (Fig. 169). Growths of newly-introduced plants 4-6 lines long and 4-6 lines in diameter, sometimes becoming under cultivation up to one inch long, and as much in their greater diameter, broadly obconic, usually flat the circular or broadly elliptic top, but different plants varying (types T and K.) sometimes being slightly obcordate, or with the centre depressed in a slight cup-like manner, more or less purple on the sides, but the top varying much in different individuals, being light green, dull green, grey-green, or rather bright rosy-carmine marked with dark green or dark purple dots, which are more or less connected or confluent into simple or branching lines, or occasionally all, or nearly all, separate, and are often faintly raised, varying on different plants in arrangement and size. Calyx-tube more or less exserted, 5-lobed, ovary included or exserted. Corolla finally 4-7 lines in diameter, opening after sunset, slightly scented; tube about as long as the calyx; petals 30-40, in 2-3 series, recurved-spreading, white or creamy-white. Stamens with slightly exserted pale yellow anthers. Style very short or nearly obsolete; stigmas 4, less than 1 line long, filiform, white.-- *C. Nevillei*, N. E. Br. in Journ. Linn. Soc. Bot., Vol. 45, p. 98. *C. obcordellum*, Sims, Bot. Mag., t. 1647, not of Haw.

Van Rhynsdorp Div., near Van Rhynsdorp, Pillans.

This is a very variable species in shape, colour and size, and I find that the plant figured in the Botanical Magazine as *C. obcordellum* is undoubtedly this species, for I have had some growths of my plants as large as or larger than that figure, and in every way like it. I have one plant of this species which in summer becomes entirely of a rosy-carmine tint, and is then a very pretty and distinct-looking plant.

28. *C. obcordellum*, N. E. Br. Growths usually about 4-5 lines long, 4-6 lines broad and $3\frac{1}{2}$ -5 lines thick, but sometimes much larger, obcordately obconic, broad transverse notch across the top (type L), green or more or less glaucous-green, usually tinted with purple when exposed to full sunshine, marked on the top with raised or tubercle-like dots, mostly confluent into irregular lines, of a dark purplish or dark green colour, according to sunshine. Calyx 4-5-lobed. Corolla 5-10 lines in diameter, sometimes both sides on the same plant at the same time, expanding between 4 and 5 p.m., closed during the day, faintly or scarcely scented; tube 2-2 $\frac{1}{2}$ lines long; petals 25-40, recurved-spreading, low milk-white to very pale rose-colour, sometimes tinged with pink at the tips. The stamens slightly exserted, anthers pale yellow. Style $\frac{1}{2}$ line long, whitish or greenish. *C. obcordellum*, Haw. Misc. Nat. p. 21 (1803); Salm Dyck, Mesemb. 1, f. 2. *C. obconellum*, Haw. Misc. Nat., p. 21 (1803); Salm Dyck, Mesemb. 1, f. 3.

Worcester Div., near Worcester, Cooper. Clanwilliam Div., near Clanwilliam, Pillans.

There is no character whatever to distinguish the two plants known in gardens and figured by Salm Dyck as *C. obcordellum* and *C. obconellum*, the distinction given by Salm Dyck and by Berger being purely fictitious. As Berthol's original descriptions are inaccessible to the majority, I here give a translation of them. "*C. obcordellum*. Twice as large as the preceding (i.e., *C. minutum*) and more obcordate, glaucescent, with the spots more elevated or sub-tubercular, and more confluent and branched or map-

307 like. Ovary included, not raised above the surface of the plant." And in another place he describes the corolla as "whitish".
"M. obconellum. Greenish, with confluent tubercle-like dots. Ovary included. Calyx 4-lobed. Petals white. Very like the preceding (i.e., M. obcordellum) and of the same size or a little larger, and apparently distinct. It differs by being less obcordate and less glaucous, and with the spots less branched, but more elevated or tubercle-like."

From these descriptions it is clear that there is no real specific distinction between them, the only distinctions mentioned, being that one is more obcordate than the other, and the spots differently branched and differently elevated. These characters of colour and markings, however, are of little value when a number of different individuals are examined. By different individuals, I mean separate plants originating from separate seeds.

29. *C. mundum*, N. E. Br. (Fig. 170). Growths about 5-6 lines long 4-9 lines broad and 4-7 lines thick, broadly obconic, with a shallow v-shaped depression across the full breadth of the elliptic or circular top (type K), or sometimes the top is concave with a raised rim all around it, or occasionally almost flat, dull greyish-green or glaucous-green, tinted with purple, marked with conspicuous blackish-green or blackish-purple, raised or tubercle-like dots that are mostly confluent into irregular lines or groups. Calyx 4-5-lobed; in well nourished plants, the tube and ovary is entirely included in the calyx, but sometimes is partly or wholly included in the plant. Corolla, 3-6 lines in diameter, opening between 4 and 5 p.m., close during the day, faintly scented; tube equalling or longer than the calyx; petals 30-40, spirally arranged, recurved, white, pale straw-coloured, or pale pink. Style 1-1½ line long; stigmas 4-5, about 1½ lines long, pale greenish.

South Africa. Locality and collector unknown.

This is one of the most distinct species of this genus, being easily recognised by the depressed top and rather large, raised, blackish dots, confluent into lines.

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Card. Chron. III. 72: 8. 1922.

(Continued from page 307.)

8 30. *C. parvinetulum* N. E. Br. Growths 4½-6½ lines long, 4-12 lines broad and 3½-7 lines thick, obconic, with a shallow v-shaped depression across the full breadth of the top (type K), rich dark purple on the sides, dull green on the top, tinted with rose around the orifice and marked with numerous separate dark green dots, all scattered or some of them arranged in a line transverse to the orifice. Calyx 5-lobed, with the tube very much compressed and up to 2-2½ lines broad. Corolla small and insignificant. 3-3½ lines in diameter, opening at about sunset, closed during the day; tube 2-3½ line long, dull greenish; petals numerous, about 1-1½ line long, creamy-white or very pale yellowish, faintly tinged with pink at the tips. Stamens with the yellow anthers, shortly exserted. Style very short; stigmas 5,

about 1½ line long, rather stout, pale greenish. *M. parvinetulum* H. E. Brown in Journ. Linn. Soc. Bot., v. 45, p. 97 (1920).

South Africa, Locality and collector unknown.

This is closely allied to *C. mundum*, but is easily recognised by the dots not being raised in the same manner into tubercles, and by its flattened corolla-tube and short petals.

31. *C. aggregatum*, H.E.Br. Growths 5-8 lines long and 2-5 lines in diameter, obconic, flattish at the top (type F), which in large growths is more or less distinctly obtusely 6-angled, and in smaller growths circular, with the centre often slightly depressed and usually with a faint ridge or keel transverse to the orifice, of a dull and somewhat bluish-green, rather inconspicuously marked on the top with minute dots, which are mostly confluent into irregular branched lines of a darker green or purplish colour. Flower unknown. *M. aggregatum*, Haw. Obs. Resemb. p. 181 and 419; H. E. Br., in Journ. Linn. Soc. Bot., v. 48, p. 91, excluding description of the flower.

South Africa. Locality and collector unknown.

By some error, which I cannot now at all account for, unless I was interrupted in my work, the description and note of the flower of a plant I now find to be identical with *M. piluliforme* were entered under *M. aggregatum* and published in my former account of this species. I have not yet seen expanded flowers of *M. aggregatum*, but late in November, when too cold for them to develop, buds have appeared, which were dark red.

EE.

Top of the growths more or less convex (Flattish in 33 *C. leviculum* and 37 *C. signatum*), or convex on each side of the central notch, which does not spread open over the whole breadth of the top as in some of those under E. (Species 33-44.)

32. *C. catervum*, H. E. Br. Growths 10-15 cm. long and 5½-6 lines in diameter under cultivation, but under natural conditions about 3-4 lines in diameter, obconic, convex on the top (type F), which is nearly circular or broadly elliptic in outline, pale greyish-green or glaucous-green, with three radiating lines of confluent dark green dots on each side of the orifice, the two lateral lines usually forked, and with a line and some dots or scattered dots only at each end of the orifice. Flowers not seen. -- *M. catervum*, H. E. Br., in Journ. Linn. Soc. Bot., v. 45, p. 93. Lainsburg Div. Near Grootfontein, Pole Evans, 4975.

37. *C. leviculum*, H. E. Br. (Fig. 5). Growths 5-7 lines long, and 3½-7 lines in their greater diameter, obconic, elliptic or nearly circular at the flattish top (type F), often purplish on the sides, greyish-green on the top with many irregular lines and small dots of dark chocolate-purple or dark green, and a thick line bordered with chocolate dots and lines around the orifice. Calyx 4-lobed. Corolla 5-8 lines in diameter, expanding about 4 or 5 p.m., closed during the day; tube not exceeding the calyx; petals 20-25, lax, whitish (very pale straw-coloured by day), sometimes tinged with pink at the tips, with a slight satiny sheen. Stamen 12-20, the upper anthers exserted, light yellow. Style, about 1 line long; stigmas 4, about 1-1½ line long, plumose-filiform, pale greenish.-- *M. leviculum*, H. E. Br., in Journ. Linn. Soc. Bot., v. 45, p. 94 (1920).

34. *C. pictum*, N. E. Br. Growths 4-7½ lines long, 3-5 lines in their greater diameter, obconic, usually with a shallow notch across the centre of the oblong or elliptic top, seems to appear slightly obcordate in side view (type E), often purplish on the sides, dull green, marked with some dots and numerous simple and branching lines (which are not formed of confluent dots) of a chocolate or purple-brown colour on the top. Calyx 4-lobed. Corolla 5-7 lines in diameter, expanding about 4 or 5 p.m.; tube exceeding the calyx-lobes; petals 18-24, lax, whitish. Stamens 12-20, with the upper anthers exserted, yellow. Style, less than 1 line long; stigma 2-4, about 1-1½ lines long, plumose-filiform, yellowish. *M. pictum*, N. E. Br., in Journ. Linn. Soc. Bot. v. 45, p. 97.

South Africa. Locality unknown, sent to Kew and to myself by Prof. P. Mac Owan, in 1878.

This species differs from *C. leviculum* by being less flattened at the top, and the surface is outlined rather indistinctly with dull green, instead of by a very conspicuous thick line as in *C. leviculum*.

35. *C. labyrinthum*, N. E. Br. Growths 5-7 lines long, usually 3-4 lines broad, and 2-3 lines thick, obconic convex and elliptic or elliptic-oblong in outline, at the top (type E), greyish-green, marked in a labyrinth-like manner with rather crowded branching and disconnected lines (not formed of dots) of a rich dark brownish-crimson, or in sunless seasons dark green, or purplish-green. Calyx 4-lobed. Corolla 4-5 lines in diameter, pink flowered, scentless; tube not longer than the calyx; straw-coloured or whitish. Stamens several, the longer shortly exserted; anthers light yellow.-- *M. labyrinthum*, N. E. Br., in Journ. Linn. Soc. Bot., v. 45, p. 94 (1920).

Locality and collector unknown, N. E. Brown
(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 72: 24. 1922.

(Continued from page 8.)

36. *C. pusillum*, N. E. Br. Growths 4-7 lines long, 2½-3½ lines broad and 2-3 lines thick, obconic, varying from nearly circular to elliptic-oblong at the convex top (as type D, but much smaller), greyish-green, marked with irregular brownish-crimson (or in sunless seasons dark green) lines. Flowers not seen. *M. pusillum*, N. E. Br., in Journ. Linn. Soc. Bot., v. 45, p. 99.

South Africa. Locality and collector unknown.

This is closely allied to *C. labyrinthum*, but seems to be distinct by its rather smaller growths, which have a great tendency to be circular in outline, and are marked with fewer and less crowded lines.

37. *C. signatum*, N. E. Br. Growths 4-7 lines long, 3½-5 lines broad and 2½-4 lines thick, obconic, with the flattish or but slightly convex or slightly notched top (type D), and oblong or elliptic in outline, somewhat grey-green, marked in a labyrinth-like manner with rather crowded, irregular, dark brownish-purple lines, or in winter-time

24 deep grass-green with the markings of a darker green. Flowers not seen. *H. signatum*, N. E. Br., in Journ. Linn. Soc. Bot., v. 45, p. 100.

South Africa. Locality unknown, Fillans.

This is allied to *C. labyrinthum* and *C. pussillum*, but is distinguished by the growth being more flattened at the base and the top flatter and often inclined to overhang the sides.

38. *C. minusculum*, N. E. Br. Growth 3-5 lines long, 3-4½ lines broad and 2½-3½ lines thick, obovoid, elliptic in outline at the convex top, often slightly notched at the orifice (somewhat as type D, but much smaller), at first bright green, becoming dull green and often suffused with purple, very minutely and densely dotted with white, with the orifice surrounded at a little distance from it by a somewhat diamond-shaped dark green or dark purple ring, and outside of the ring are some irregular dark purple or dark green disconnected lines. Calyx 4-lobed. Corolla 8-15 lines in diameter, expanding in day-time irrespective of sunshine; tube 5-6 lines long, dull orange below, fading into yellow at the top; petals of two kinds, the outer series of 10-12, widely spreading linear-spathulate, obtuse, and 1-1½ line broad, bright orange, fading into light yellow at the base, and an inner series of 5-6 small and very acute petals that are sometimes magenta and sometimes (on the same plant) orange-yellow tipped with purple. Stamens 6-8 included in the corolla-tube, yellow. Style ½ lines long; stigmas 4, less than ½ lines long, dark orange. *H. minusculum*, N. E. Br., in Kew Bull., 1913, p. 118.

Glenwilliam Div., near Glenwilliam, Fillans.

This is one of the most beautiful species in this genus, the prettily marked growths and the richly coloured flowers, which are much larger than the growths, make it a very attractive plant.

39. *C. paucillum*, N. E. Br. (Fig. 13). Growths 5-7 lines long, 3½-6 lines broad and 3-4½ lines thick, obconic, convex, with a small transverse notch at the centre of the oblong or elliptic-oblong top (type E), varying from chalky-green or pale greyish-green to dull green, marked with separate dots and lines formed of confluent dots of purple-brown or dark green, usually a line extends from each side of the orifice over the top, and the other lines and dots are irregularly scattered on the other part, or there is a series of three lines radiating from each side of the orifice. Calyx 4-lobed. Corolla 4-7 lines in diameter, expanding in the evening, closed during the day, scentless, tube about as long as the calyx; petals 20-26; lax, whitish or very pale straw-coloured. Stamens 13-20, with the upper anthers shortly exserted, pale yellow. Style 1-1½ lines long; stigmas 4, shorter than the style, about 1-1½ line long, plumose-filiform, greenish. *C. paucillum*, N. E. Br., in Journ. Linn. Soc. Bot., 45, p. 97 (1920).

South Africa. Locality unknown, Fillans.

40. *C. polulum*, N. E. Br. Growths 5-6 lines long, 2½-5 lines broad and 2½-3½ lines thick, obconic, elliptic to nearly circular in outline at the convex top, glaucous-green, with a few short lines formed of connected dots and a few separate dots of a rather darker dull green, but not very conspicuous. Calyx 4-lobed, entirely dull red-dish. Corolla about 7 lines in diameter, exserted; anthers light yellow. Ovary dome-shaped on the top. Style less than ½ line long; stigmas 4, nearly twice as long as

24 the style, slightly thickened upwards.

Lainsburg Div., near Lainsburg, Pole Evans, 8916 A.
N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 72: 54. 1922.

(Continued from page 124.)

- 54 41. *C. petraeum*, N. E. Br. (Fig. 34). Growths 5-6 lines long, 2-3 lines broad and $1\frac{1}{2}$ -2 lines thick, obconic, convex and elliptic in outline at the top, glaucous-green or slightly bluish-green, marked in a somewhat regular manner with interrupted or continuous lines of confluent blackish-purple or very dark green dots; one such line usually extends over the middle of the top from each side of the orifice, and branching from or disconnected with this central line on each side are two simple or forked lines and one or two separate dots. Calyx 4-lobed. Corolla only seen in a dried state apparently about 3 lines in diameter, with about 25 petals, probably whitish, in the dried flower seen usually marked with from 1-3 linear glands. Stamens all with exserted yellow anthers. Style about $\frac{1}{2}$ line long; stigmas 4, about $\frac{1}{2}$ line long, slightly thickened upwards.

Lainsburg Div., near Lainsburg, Pole Evans.

42. *C. vagum*, N. E. Br. (Fig. 25). Growths under cultivation variable in size and form, 5-7 lines long, 3-6 lines broad and $2\frac{1}{2}$ -5 lines thick, some, as viewed from above, regularly elliptic in outline, others more or less distinctly six-angled, the angulation seems chiefly confined to the larger growths, obconic, with the top slightly convex and the larger growths slightly keeled, smooth, glaucous-green or greyish-green, with about 3 dots on each side of the orifice, behind the middle dot on each side extends a straight line of more or less connected dots, towards the middle angles, and on each side of that line at a little distance from it are one or two dots or a diverging line of dots directed towards the lateral angles, all dark purple-brown. Calyx 5-lobed, with the tube 2 lines long, and partly exserted. Corolla 7-10 lines in diameter, expanding in the evening, not scented, closed during the day; tube not longer than the calyx; petals 26-31 lines in 1-2 series, very lax, widely spreading, 3-4 lines long, very narrowly linear, acute, white. Stamens about 20, in 3 series, all more or less exserted from the corolla-tube; anthers light yellow. Style, half a line long; stigmas 5, erect, 1 line long, not nearly reaching to the lower anthers, filiform.

South Africa. Locality unknown. This species was sent to me by Prof. P. MacOwan, in 1878.

43. *C. scitulum*, N. E. Br. Growths 6-7 lines long, 4-7 lines broad, and $3\frac{1}{2}$ -6 $\frac{1}{2}$ lines thick, obconic, somewhat convex at the broadly elliptic top (type E), with or without a slight transverse notch at the centre, greyish-green, tinted with purple on the sides and marked on the top in a map-like manner with branching and more or less connected lines of a dark purple-brown or violet-brown colour, or (if not exposed to the sun) dark green. Calyx 4-lobed. Corolla 3-8 lines in diameter, expanding in the evening, scentless; tube equalling or longer than the calyx;

54 petals 30-35 in 2-3 series, milk-white. Stamens 15-20; anthers all more or less exserted, creamy-white or very pale yellowish. Style 1 line long; stigma 4, plain to the base of the lobes, $1\frac{1}{2}$ -2 lines long, whitish.-- *M. scitulum*, N. E. Br., in Journ. Linn. Soc. Bot. v. 45, p. 100.

South Africa. Locality and collector unknown.

44. *C. uvaeforme*, N. E. Br. Growths subglobose or grape-shaped, resembling the green grape called "Luscadine," pale green, with small, slightly confluent dots of a darker green.-- *C. uvaeforme*, Haw., Rev. Fl. Succ., p. 84.

South Africa. Locality and collector unknown.

The above description, copied from Haworth's account of it, is all that is known of this plant. I have not seen any plant that can be referred to it.

EE.

Growths distinctly obcordate, with or without a slight ridge or keel extending from the orifice to the top of the convex lobe on each side of it, and often with the slopes of the notch on each side of the ridge more or less flattened. (Types O-Q). Species 45-49.

The six species comprising this small group are very similar in appearance and very difficult to discriminate by characters that can be set down in words, yet when seen growing side by side, can easily be distinguished. They all expand their flowers in the evening, or late in the afternoon, and the flowers of all the species are very pleasantly scented, about like lilac. Calves, and of some shade of pink, except those of *C. placitum*, which vary from white to pink. The stamens (except in *C. placitum*) are numerous (20 or more) and whitish, with the upper series of anthers visible at the mouth of the corolla-tube. But the size, shape, and general character of the flower of each species seems to be constantly different from that of the other species. So that in the following descriptions none of the above general characters are mentioned.

45. *C. ficiforme*, N. E. Brown (Fig. 26). Growths $6\frac{1}{2}$ -12 lines long; 5-9 lines broad, and $4\frac{1}{2}$ - $7\frac{1}{2}$ lines thick, without or with only a faint ridge on the faces of the notch, which is not so deep as in the other species (type E.), light crested green or somewhat glaucous-green, sometimes tinted with purple on the basal part, and thickly covered on the top with moderately large dark green conspicuous dots, all separate or a few of them more or less confluent into a short line, extending from the centre of the orifice on each side over the top, and a confluent line of them around the orifice. Calyx 4-lobed; tube much exserted. Corolla 10-12 lines in diameter; tube at first not longer than the calyx, finally exceeding it, white; petals 30-40 in few series, the outer finally recurved, the others widely spreading, white for about one-fourth of their length at the base, the upper part bright pink. Stamens numerous in 2-4 series, with the white anthers of the upper series just exserted. Style and stigma imperfectly developed in the only flower examined.-- *C. ficiforme*, Haw., Rev. Fl. Succ., p. 83 (1823); N. E. Br., in Gard. Chron., 1876, p. 743, and 1886, v. XIV., p. 373, Fig. 73.

Worcester Div. Near Worcester, Cooper.

24 The locality from which the original plant came is unknown, but it may very well have been the same as where Cooper collected it. Haworth states that he received it from Saln-Dyck, in 1819, and there is a drawing at New of a plant of *M. ficiforme*, stated to have been received from Haworth in 1824, that is labelled as having been received from Bowie, who says it grows on the rocks of Kogmans Kloof and Lange Kloof." I suspect these localities to have been given by Bowie from memory, and I much doubt their being correct. At any rate, the plant here described is the same as that figured in the New drawing, which must be taken to represent the type. H. E. Brown
(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 72: 83. 1922.

(Continued from page 54.)

83 46. *C. altile*, H. E. Br. Growths 10-12 lines long, 8½-12 lines broad and 7-10 lines thick, with the ridge on the faces of the notch half globose, without a keel on the faces of the notch, ~~the lobes of the notch~~ lobes, of a slightly shining grass-green, tinted with purple on the basal part, and thickly marked on the top with rather large separate dark green dots and a cross-shaped marking or a single line on each lobe formed of confluent dots. Calyx 4-5-lobed; tube included. Corolla 10-15 lines in diameter; tube not exceeding the calyx; petals 60-65, spreading right and left as if the flower were parted from down the middle, somewhat lax, pink, fading into white at the very base. 1½ line long; stigmas 4, plumose-filiform, pale greenish.--*M. altile*, H. E. Br. in Journ. Linn. Soc. Bot., Vol. 45, p. 92.

South Africa. Locality and collector unknown.

The bloated appearance of this plant seems constant year after year and readily distinguishes it from the other species.

47. *C. odoratum*, H. E. Br. (Fig. 35). Growths 5-12 lines long, 6-12 lines broad and 4-9 lines thick, with the ridge on the faces of the notch distinct (type 2); usually the lobules on each side of the notch are short and very broadly rounded in the dorsal view, but sometimes they rise conically into an obtuse ridge, varying from green to grey-green according to sunlight, sometimes tinged with purple, sprinkled with separate dots and a line of confluent dots over the top on each side of the orifice and usually a doubly-arched line of them crossing each lobule. Calyx 4-5-lobed, partly exerted. Corolla 10-14 lines in diameter; tube about as long as the calyx; petals 65-80, in about 4 series, overlying each other, not lax, bright magenta pink, white at the very base. Style 2-1½ line long; stigmas 4-5, about 1 line long, greenish-white.--*M. odoratum*, H. E. Br. in Journ. Linn. Soc. Bot., 1913, p. 119. *M. jugiferum*, H. E. Br. in Journ. Linn. Soc. Bot., Vol. 45, p. 94 (1920).

Worcester Div. On a mountain near Worcester, Cooper, and without locality, Fillans.

When the plant I described as *M. jugiferum* was sent to me it seems so very distinct from *C. odoratum* in shape and general appearance that I had no suspicion that it was that species, and was assured that its ridged lobules was a permanent character;

83 in two years, however, it altered completely, and is now quite indistinguishable from *C. odoratum*. The more crowded petals overlying each other at once distinguishes this from *C. altile* and *C. pallidum*.

48. *C. pallidum*, N. E. Br. Growths 8-15 lines long, 6-11 lines broad and $4\frac{1}{2}$ -10 lines thick, with a faint or distinct ridge on the face of the notch (type 1), pale chalky-green, marked on the top with some indistinct scattered dots of a darker green, and a line of confluent dark green or purple dots crossing the top transversely to the orifice, with or occasionally without an ellip-rine of confluent dots enclosing the notch and passing over the lobe on each side midway between the orifice and margin. Calyx 3-5-lobed; tube included or partly exerted. Corolla 12-15 lines in diameter; tube usually not longer than the calyx; petals 45-55, lax, usually divided into two groups spreading right and left, pink at the upper two-thirds, white at the lower third. Style about 1 line long; stigmas 4, rather longer than the style, plumose-filiform, pale greenish.-- *C. pallidum*, N. E. Br. in Journ. Linn. Soc. Bot., Vol. 45, p. 96.

Worcester Div. On a mountain near Worcester, Cooper.

The pale chalky-green colour of this species readily distinguishes it from its allies. In the laxity of its petals it is similar to *C. altile*, but they are paler in colour and white for a greater length at the base.

49. *C. placitum*, N. E. Br. Growths at newly-imported plants 4-8 lines long, $3\frac{1}{2}$ - $6\frac{1}{2}$ lines broad, and $2\frac{1}{2}$ - $4\frac{1}{2}$ lines thick, becoming much larger under cultivation, with the faces of the notch keeled (type 2), some plants entirely green, others more or less tinted with or entirely purple, with a line of confluent dark green or dark purple dots on the keel of the notch with its outer end forking into arched lines enclosing its notch, outside of this enclosing lines are one or two short lines and some scattered dots. Calyx 4-lobed, usually considerably exerted. Corolla 7-10 lines in diameter; tube slightly exceeding the calyx, white; petals 40-50 in 2-3 series, usually spreading, not arranged in two groups, and not so crowded as in *C. odoratum*, entirely white or pale-lemon yellow, with the tips on the back or on both sides tinted with pink, or entirely very pale pink, varying on different plants; stamens about 15-16, in 3 series. Style less than 1 line long; stigmas 4, about 1 line long, pale yellowish-white.-- *C. placitum*, N. E. Br. in Journ. Linn. Soc. Bot., Vol., 45, p. 99.

Robertson Div., near Robertson, Karloth, 7985.

II

Growths two-lobed at the top (very shallowly in *C. guesitum*), and the lobes or top of the growth compressed and keeled somewhat as if pinched between the finger and thumb, with flat sides to the notch separating the lobes, except in 57, *C. turrisgerum*, which has cylindric lobes convex or subtruncate at the top. Types R-T. (Species 50-57).

F.

Surface feeling slightly and harshly puberulous to the touch,

83. and when viewed with a lens seems to be covered with minute points, scarcely hairs, best seen on the sheaths. (Species, 50-51).

50. *C. quaesitum*, N. E. Br. Growths 4-7½ lines long, 4½-7½ lines broad, and 3½-4½ lines thick, in side view somewhat truncately obovoid, with a small notch ½-1 line deep at the centre of the keeled tor (type R), light greyish-green with a faint bluish tint, with or without a few dots of a slightly darker green, that are sometimes conspicuous, at others scarcely perceptible without a lens and sometimes quite absent. Flowers unknown.--*C. quaesitum*, N. E. Br., in Journ. Linn. Soc. Bot., v. 45, p. 65.

Namaqualand, Jackals Mountains, near Sendlings Drift, Pearson 6123.

This is the smallest species of the group. I have not yet succeeded in setting it to flower.

51. *C. apistum*, N. E. Br. Growths 1-2½ inches long, 9-13 lines broad and 6½-10 lines thick, compressed-oblong, with lobes 3-8 lines long (type S), whitish green or light glaucous-green, often reddish on the margins and keel of the lobes, very conspicuously marked all over with dark green scattered dots. Calyx 5-lobed. Corolla an inch in diameter, somewhat funnel-shaped, with 45-60 widely spreading yellow petals. Stamens numerous in 5 or 6 (or more) series, the upper exserted, yellow. Style nearly as long as the corolla-tube; stigmas 5-6, finally 2-2½ lines long and exserted beyond the stamens, dull orange.--*C. apistum*, N. E. Br. in Journ. Linn. Soc. Bot. v. 45, p. 64.

Namaqualand. Western slopes of a ridge between Daunabis and Bethany Drift, Pearson, 6058.

This is readily distinguished from all its allies by its chalky-green colour, conspicuous dots, and peculiar surface.

FF.

Surface quite glabrous, smooth to the touch. All the species distinctly two-lobed.

52. *C. bilobum*, N. E. Br. (Fig. 36). Growths 1½-2 inches long, ½-1½ inch broad, and 7-10 lines thick, cuneately oblong, compressed, with lobes 4-9 lines long (type S), light bluish-green (glaucous-green, ex Harloth), dotless, with a wedge-shaped area of rather darker dull green under the notch, and the margins and keel of the lobes often reddish or purplish tinted. Calyx 4-6-lobed. Corolla 10-15 lines in diameter, expanding in bright sunshine, scentless; tube longer than the calyx; petals 40-45, somewhat laxly recurved-spreading, bright yellow stamens in 4-5 series, the upper exserted, yellow. Style varying from 1-4½ lines long; stigmas 1-6, varying on the same plant in different years from 3½-6½ lines long, sometimes only equalling the stamens, sometimes exserted much beyond them, dull orange.--*C. bilobum*, Harl. in Trans. S. Afr. Phil. Soc. v. 18, p. 44, pl. 5. f. 2 (1907), and Fl. of S. Afr. v. 1, p. 201, pl. 49, f. F; Berger, Mesemb., p. 200, f. 35 (copied from Harloth's original figure); L. Bolus in Ann. S. Afr. Mus. v. 9, p. 14. *C. stylorum*, N. E. Br. in Bot. Mag. t. 9393, f. 2 (1913).

Little Namaqualand. Plains between Stinkfontein and Chubies-
is, Pearson 6203, and without precise locality, Harloth 3750.

53. *C. cauliferum*, N. E. Br. (Fig. 37, p. 83). Plant with age forming distinct branching stems up to 5 inches (or more?) long, above ground under cultivation, but probably covered with drifting soil under natural conditions. Growth 1-1½ inch long, 8-10 lines broad and 6-7½ lines thick, cuneately oblong, with lobes 1½-2½ lines long (type S), light bluish-green, becoming glaucous-green in S. Africa, distinctly pellucid dotted when held against sunlight, with a wedge-shaped area of darker green under the notch, with a purplish spot at the apex of the lobes, or along their margins and keel dull purplish. Calyx 4-5-lobed. Corolla ½-1 inch in diameter, expanding in the morning in bright sunshine, scentless; tube about as long as the calyx; petals 10-12, in 4-5 series, bright yellow. Stamens numerous, in 4-5 series, the upper just exerted, yellow. Style nearly as long as the corolla-tube; stigmas 4, filiform, 3-4 lines long, shorter than or exceeding the stamens, varying from orange-red to pale greenish-yellow.

Little Namaqualand. Upper north-western slopes of hills south-west of Chubiessis, Pearson 6176.

Although similar to *C. bilobum*, this constantly differs by developing stems, by its much shorter lobes, and its bluish-pellucid dotted. It also grows on hill-tops, while *C. bilobum* grows on plains.

54. *C. nuciforme*, N. E. Br. Plant developing branching stems with age, which become subterranean under natural conditions. Growths 7-12 lines long, 6-10 lines broad and 5½-8½ lines thick, ovoid or subglobose slightly compressed, with the short lobes 1½-2½ lines long, uniformly glaucous-green, with a purplish keel to the lobes. Flowers not seen; according to Miss Kensit the calyx is 6-lobed, and the petals of the corolla about 6 lines long, rosy, striped. Ovary convex at the top. Stigmas 6, about 7 lines long, filiform. *M. nuciforme*, H. G. Rees, p. 126, 440 and 450 (1794), Misc. Nat., p. 22, and Rev. Fl. Succ., p. 84. *M. cryptopodium*, Kensit in Trans. Roy. Soc. S. Afr., v. 1, p. 150, pl. 21, f.c. (1909).

Laingsburg Div. Left side of the road between Witte Poort and Laingsburg, Pillans, 892. Originally introduced by Masson. N. E. Brown.

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 72: 124. 1922.

(Continued from page 84.)

55. *C. Elishae*, N. E. Br. (Fig. 51). Plant not developing stems with age. Growths 7-14 lines long, 6-10 lines broad and 5-8 lines thick, ovoid or oblong-ovoid, with lobes 2-4 lines long (type S), of a slightly bluish-green colour with a darker area under the notch, somewhat obscurely marked with scattered darker-green dots, and the keel often purplish. Calyx 4-5-lobed. Corolla ½-1 inch in diameter, expanding in the morning irrespective of sunshine, if the temperature is very annual; petals 10-12, in 5 series, bright yellow. Stamens numerous, in 3-4 series, the upper exerted, yellow. Style 2½-3 lines long; stigmas 5-6, usually exceeding the stamens, 1-2 lines long, filiform, pale yellow or greenish. *M. Elishae*, N. E. Br., in The Gardeners' Chronicle, 1916, v. 60, p. 252; Bot. Mag., t. 8776 B, a very poor

South Africa. Locality and collector unknown.

This species increases more rapidly and flowers more freely than any other species of this group in cultivation, and a well grown plant in full flower is very charming. No idea of its beauty can be obtained from the bad representation of it in the Botanical Magazine.

56. *C. gracilistylum*, N. E. Br. Plant not forming stems with age. Growths 10-15 lines long, 6-8 lines broad and $4\frac{1}{2}$ - $5\frac{1}{2}$ lines thick, oblong, compressed, with lobes 2-3 $\frac{1}{2}$ lines long (type S), glaucous-green or bluish-green, more or less distinctly dotted all over with darker green, and with a red keel to the lobes. Calyx 3-4-lobes. Corolla 7 $\frac{1}{2}$ -10 lines in diameter, expanding in the daytime and remaining open irrespective of sunshine or cloudy weather, scentless; tube as long as the calyx; petals 25-30 in 2 series, bright pink or bright magenta on both sides, white at the base. Stamens about 40, in 4 series, with the upper anthers just showing, at the mouth of the corolla-tube, yellow. Style 4-5 lines long, slender; stigmas 4, about 1 $\frac{1}{2}$ line long, exserted and recurving among the anthers. *C. gracilistylum*, L. Bolus in Ann. S. Afr. Mus., v. 9, p. 141, pl. 3, f. 1 (1913). Namaqualand. Hill south of Stinkfontein, Pearson 5572.

57. *C. turrigerum*, N. E. Br. Plant not forming stems with age. Growths 5-6 $\frac{1}{2}$ lines long, $4\frac{1}{2}$ -6 lines broad across the top of the lobes and 3 lines thick; lobes 2-3 lines long, subcylindric and about 2 $\frac{1}{2}$ -3 lines in diameter (type T) angularly convex from the presence of raised lines connected in a map-like manner and enclosing slightly depressed areas, light greyish green or glaucous-green, with the raised lines of very dark green, and all the lower part more or less tinted with purplish and dotted with dark green. Flowers not seen. *C. turrigerum*, N. E. Br., in Journ. Linn. Soc. Bot., v. 45, p. 102.

Halmesbury Div. Vicinity of Klibheuvel, Pillans.

Excluded Species

Mesembryanthemum nanum Schlechter, in Engl. Jahrb. Vol. 27, p. 128, has been placed among this group of Sphaeroids, but the material and description are too imperfect to permit of a definite place under *Conophytum*, to which it may not belong.

N.E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 78: 211. 1925.

(Continued from Vol. LXXII, p. 124)

When the words "To be continued" were published in The Gardeners' Chronicle for 1922, Vol. LXXII, p. 124, at the end of my thirty-third article upon this group of plants I had no idea that so long a period would elapse before those words would take effect. The delay has been partly caused by adverse circumstances over which I had no control, and partly and chiefly because, just before that article was published I made a discovery that caused me to make fresh investigation in the structure of the flowers,

211 fruits and seeds of these plants, with the result that I soon perceived that during the one hundred and seventy-two years that has passed since the genus *Mesembryanthemum* was established by Linne, no author (including myself) writing about this group of plants appears to have properly dissected the flowers and examined the relationship of their parts as compared with those of other species, while the structure of the fruits and nature of the seeds has been utterly ignored. All of us have followed one another blindly by accepting the generic characters as given in books without investigating their applicability as a whole to the various species.

The discovery I allude to above was that out of seven specimens received from South Africa, all named *Mesembryanthemum pom-eridianum*, two has fruits and seeds which I

212 noticed were so utterly different from those of that well-known plant that they could not possibly belong to the same genus. I then examined the flowers of the seven specimens and found them to represent two distinct types of structure. Certainly the flowers and fruits and seeds of these seven specimens could not have been examined or they would not all have been deemed to be the same species, although they somewhat resemble one another in general appearance.

This discovery caused me to make a preliminary examination of several other species that were distinct from one another in their type of habit, and my investigation soon convinced me that it is easy to demonstrate that, in accordance with the manner in which genera are made and characterised in other natural orders, the genus *Mesembryanthemum* as at present understood in books represents a small Natural Order and unquestionably consists of a number of perfectly distinct and usually easily recognisable genera, which have all been assigned to the one genus merely because their flowers have a superficial resemblance to one another.

As I have already pointed out in these articles, Haworth considered that some of the sections into which he divided the genus were really distinct genera, although he did not characterise them by structural details, and with few exceptions he did not propose names for them, and such names as he did propose have not been taken up by any author before I did so in these articles. I find, however, that Haworth was perfectly correct in his views. Yet, although his sections are accepted, the differences assigned to them are based almost entirely upon habit and vegetative characters, the important structural characters that accompany many of the vegetative characters being overlooked or ignored. If, however, we turn to Orders where a large number or most of the genera composing them have flowers that are very much alike in general appearance, such as are found in *Convolvulaceae*, *Malvaceae*, *Cruciferae*, *Umbelliferae*, *Leguminosae* and *Compositae*, we find that the genera of these orders are based upon structural differences in the flower or fruit that are constant, even if small and often not observable without dissection, but are often accompanied by a difference in habit or vegetative character.

Now I find that *Mesembryanthemum* as hitherto constituted is an exact parallel of such orders, for although the flowers and even the fruit in some cases of the various sections have much superficial resemblance to one another, yet when examined, are in many instances found to have very different structural characters. But I have had considerable difficulty in obtaining flowers and fruit-- especially fruit and seeds--of many kinds in a

212 fit state for examination, and I would here like to acknowledge my indebtedness to and to thank those kind friend in South Africa who have supplied me with material, viz:-- Mr. A. J. Austin, Professor H. Corston, Mr. T. H. Leslie, Mr. A. Charlott, Mr. W. E. Villiers, Dr. J. W. Holtzhausen, Mrs. E. A. van der Walt, and especially to Mr. F. Smith for so generously placing at my disposal the flowers and fruit of the fine collection of species he brought to exhibit in the South African section of the Wembley Exhibition in 1924, without which some of the work to follow could not have been accomplished.

It is certainly remarkable that during the one hundred and seventy-two years that have elapsed since Linne established the genus *Mesembryanthemum* no monographer seems to have examined the details of the floral structure of the various species, while the characters presented by the fruits and seeds have been entirely ignored.

Up to the time of commencing the articles I have already published, I was under the impression that De Candolle, Bentham and Hooker, Sonier, and Berger, when describing the characters of the genus and species, must have examined the structure of the flowers (especially the ovary) and fruit, and that there was nothing more to be discovered concerning that structure. I was therefore much surprised to find how greatly various groups of species differed in the placentation and structure of the ovary and fruit, apart from other differences in the structure of the flower, such differences being usually accompanied by a conspicuous difference in habit. I believe that this is the only large genus that has endured for so long a time as Linne left it. If it had belonged any other author it is almost certain that it would have been divided into several genera long ago, for there are characters for their separation in plenty when looked for. Having realised this, I proceeded to examine the flowers and fruit of all the species placed under the genus so far as material has been available. This has occupied a very great amount of time and much remains to be done, because I have been unable to obtain from South Africa the necessary flowers and fruit of some of the sectional types for examination. So that this must not be looked upon as a revision of the whole group, but merely as a preliminary effort to divide it into natural genera, and to define them structurally, so that the proper position of new or imperfectly known species may hereafter be more easily and more accurately determined.

The result of my examination demonstrates that *Mesembryanthemum* as at present understood consists of two well-defined and easily recognised primary groups, viz:--

1. Species with the ovules and seeds borne on the central axis of the ovary and fruit, that is, with axile placentation.
2. Species with the ovules and seeds borne along a central line on the outer wall or floor of the cells of the ovary and fruit, a rather peculiar form of parietal placentation.

Each of these groups can be further sub-divided into genera by a combination of some of the structural differences found in their flowers and fruits, which are as follow:--

- (a) The calyx is lobed down to its union with the ovary, or is produced above that union into a shallow cup or a

- short or long tube, and before dividing into lobes.
- (b) The petals are free almost or quite to the base, or are united below into a short or long tube, and are inserted in the angle where the calyx unites with the ovary, or on the sides or at the apex of the calyx-tube.
 - (c) The stamens are erect, or are incurved over or bent down into the cup or tube of the calyx.
 - (d) A true non-stigmatic style is present or it is absent, and the stigmas (the so-called styles of books) are stigmatic to the base.
 - (e) The stigma is one only and sessile and circular or elliptic in outline, or the stigmas (whether a style is present or not) are 4-20 and vary in form.
 - (f) The ovary is inferior, or it is partly or more than half superior.
 - (g) The fruit is indehiscent, or it opens by valves.
 - (h) The fruit is one-celled, or it is 4-20-celled.
 - (i) The valves of the fruit (capsule) are provided with expanding keels, or those organs are modified into non-expanding wings.
 - (j) The cells of the capsule are roofed with cell-wings, or they are open and without cell-wings.
 - (k) The opening of the cells of the capsule is nearly closed by a tubercule, or there is no tubercule at the opening.
 - (l) The seeds are wingless, or are broadly winged.
 - (m) The seeds are regularly arranged in a single whorl around the central axis, or they are irregularly placed in the cells.
 - (n) There is also the very important general character and nature of the leaves and whether they are alternate or opposite, or dotted, or are without dots.

Of these differences only three or four have been even mentioned by authors and have apparently been over-looked. Yet in no other order of plants do we find that such a multitude of perfectly distinct characters are allowed to remain in combination in the same genus. I therefore propose to utilise these characters in various combinations for the purpose of dividing this hitherto unwieldy heterogeneous group into smaller and more uniform genera, so that species can be more easily referred to their proper position. For in the monographs as they at present exist, I find the arrangement so chaotic that totally different types of structure are mixed together in the same group. And at the present time species are being described and referred to this or that group or supposed affinity in a most haphazard manner, or are described without any indication of affinity, rendering it almost impossible to identify the species without seeing the type specimen. And I myself must plead tributed to the chaos. This, however, has been unavoidable, as there is no means of discovering from books the true affinity of many of the species. Added to this there is the further difficulty of knowing to what genus some of the species described by Aiton and Haworth pointed should be referred. For, as I have elsewhere pointed out, the two most recent monographs of *Mesembryanthemum*-- that of Sonder and of Berger-- are compilations without any original research work embodied in them, chiefly based upon the excellent figures and descriptions in Salm-Lyck's work, which,

212 good as they are, are sadly deficient in the structural details that are most needed, and in many cases are figured and described under a wrong name, and as these names and descriptions are more or less copied in the later monographs alluded to, without investigation as to whether they represent the plants Linne, Haworth or Aiton intended should bear those names, there are many cases where the species described in these monographs are quite wrongly named. A conspicuous instance of this may be cited in the case of *M. glomeratum*, Linn., which as figured or described by Salm Dyck, Sonder and Berger, is not that species at all, but is *M. polyanthum*, Haw., while the real *M. glomeratum*, Linn., is the plant those authors have as *M. roseum*, Willd. The corrected synonymy of these and many others will be given hereafter under the respective genera to which I refer the species.

The division of *Mesembryanthemum* as hitherto understood into new genera renders it necessary to consider and decide which of the species known to Linne should be accepted as being typical of the genus, that is, those which best accord with the characters assigned to this genus by Linne. This is not quite a simple matter, as the following will demonstrate.

When establishing this genus Linne placed it in his Class Icosandris (i.e., with numerous stamens), and the Order Pentagynia (i.e., with five styles or stigmas)... In his *Genera Plantarum*, ed., 5, p. 215 (1754), and ed. 6, p. 252 (1767), he characterises the genus *Mesembryanthemum* as follows:-- Calyx 10-lobed (i.e., 5-lobed), persistent. Corolla monopetalous; petals very numerous, in several series, with their claws slightly united. Stamens numerous, as long as the calyx. Ovary below the receptacle (i.e., inferior), crowned with five obtuse angles; styles usually five, subulate, erectly reflexed, stigmas simple. Capsule fleshy, roundish, marked with five umbilical rays, and with many cells as there are styles. Seeds many, rounded.

At the end of the generic characters Linne remarks in italics that "The number is not constant, some have a four-fid calyx, with four styles; others have ten styles." Such remarks were always added by him to indicate species that diverged from what he considered to be essential characters of the genus.

It should be noted that although Linne and other authors describe the stigmatic organs as styles, they are really stigmas, being stigmatic to the base. So far as I am aware, a true non-stigmatic style is not present in any of the species known to Linne. N. E. Brown

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 78: 232. 1925.

(Continued from page 212.)

232 Upon analysing the Linnean characters as applied to the species Linne enumerates, it becomes evident that there is some incongruity in his definition and that he could not have properly examined the species he described. Because the only species that can be taken into consideration in the selection of a type for the genus are the thirty-five enumerated in the first edition of his *Species plantarum* published in 1753. If these species are examined and compared with his generic characters in the endeavour to determine which of them should be accepted to constitute the

232 type of the genus Mesembryanthemum, the following appears to me the best method of arriving at a satisfactory answer to this somewhat complicated problem.

In the first place it is clear from his assigning this genus to the Class Icosandria and Order Pentagynia that the primary essential characters of the genus are that it should have numerous stamens and five stigmas (or styles as he calls them). Therefore we may eliminate from the list of species described by Linne the seven species which have eight to seventeen stigmas and cells to the ovary. These are--*M. calamiforme*, *M. acinaciforme*, *M. rostratum*, *M. loreum*, *M. difforme*, *M. linguiforme*, and *M. rupestriforme*, which as Linne himself pointed out do not accord with the generic character of "stigmas and cells of the ovary 5." Of some of these Linne does not mention the number of their stigmas; indeed it is certain that he never had specimens of many of the species he described and that he only knew them from the descriptions and figures in Dillenius's *Hortus elthamensis*.

The next characters of importance to take into consideration are that the petals should be united at the base into a short tube, and the ovary be inferior. Here we are faced with a somewhat curious problem of contradictory characters, which again demonstrates that Linne could not have examined the flowers of the species he described. Out of the thirty-five species he described, only one-sixth of them have a monopetalous corolla, viz.:-- *M. nodiflorum*, *M. crystallinum*, *M. geniculiflorum*, *M. noctiflorum*, *M. splendens*, and *M. tortuosum*. All the others have the petals free to the base. And these six species do not accord with his character of the ovary being inferior, for they all have the ovary partly superior, or more than half-superior, and moreover, they all have axile placentas, a character not mentioned by Linne, while all the other species have free petals, an inferior ovary and the placentas on the outer wall or floor of the cells. Therefore, either the character of the monopetalous corolla or that of the inferior ovary must be discarded as one of the principal characters of the genus. I propose to reject that of the monopetalous corolla (petals united into a short tube at the base), since it applies to such a small proportion of the species, and to eliminate these six species from the genus, as their placentation is also quite different.

The fruit is described by Linne as fleshy, but excepting *M. acinaciforme*, the Hottentot Fig and allies, the fruit of all known species is a dry capsule. I very much doubt if Linne ever saw the ripe fruit of any species, for there is no fruit preserved in his herbarium, and I suspect that he ascribed this character to the genus from the statements of others concerning the fleshy edible fruit of the Hottentot fig. The statement that the fruit is roundish must have been taken from the figures in *Hortus elthamensis*, for the fleshy fruits of *M. acinaciforme* and allies are not "roundish," but elongated, conical or obovoid. Therefore, as the only species with fleshy fruit (*M. acinaciforme*, Linn., which at that date as he then understood the species included also *M. edule* as a variety) does not accord either in its shape or the number and character of its stigmas (which are rhomboid) with the Linnean definition, this species, as previously mentioned, must be eliminated from the genus and the character of the fruit being fleshy also discarded as a generic character for *Mesembryanthemum*.

I find that the only species of those enumerated in the first edition of Linne's *Species plantarum* that is represented in the Linnean Herbarium is *M. tenuifolium*, which has the petals free to the base, five stigmas, and an inferior five-celled ovary. But in his *Hortus Cliffortianus* Linne enumerated thirty-five species which he probably saw, although the only species preserved in the Hortus Cliffortianus Herbarium at the British Museum are *M. tenuifolium*, *M. pomeridianum*, and these merely repeat the story, for five of them have eight to seventeen stigmas and cells to the ovary and four have a short tube to the corolla and a partly superior ovary with four to five stigmas and cells, and twenty have the petals free to the base and an inferior ovary with five stigmas and cells to the ovary. These of course, being the same species as are described in his *Species plantarum*. Therefore in the bulk of the species that it is probable Linne actually saw but may not have examined, as well as those he enumerated, amounting in all to twenty-two in number, some have a short tube and on an inferior ovary with five stigmas, and as these characters cover the majority of the species at present placed under the genus, I propose that they be adopted for the selection of a type for the genus.

I therefore propose to reject the above-mentioned thirteen species as not strictly conforming with the chief characters of the Linnean definition of the genus, and from the remaining twenty-two species (which all have five stigmas and an inferior ovary with five cells, and the placentas on the outer wall of the cells, and with the exceptions that their corolla is not monopetalous, and their fruit not fleshy, as above explained, agree in all other characters with the Linnean definition of the genus) to select as the type of the genus *Mesembryanthemum* the first species described in the first edition of Linne's *Species plantarum* that (excluding the character of the corolla being monopetalous) conforms with the definition of the genus as given by Linne. This species proves to be *M. umbellatum*, for the four species preceding it (*M. nodiflorum*, *M. crystallinum*, *M. geniculiflorum*, and *M. noctiflorum*) all have, as stated, a short tube to the corolla and a partly superior ovary.

So that *M. umbellatum*, L., may be accepted as being the type of the genus, and, of all the species of the genus, the two species then known to Linne agree with it in general habit and structure, but it likewise accords in these particulars with the majority of the species that have been described since the time of Linne. Therefore the acceptance of *M. umbellatum*, L., as the type of the genus *Mesembryanthemum* will not only prevent the very great changes of nomenclature that would occur if one of the thirteen rejected species were selected in its place, but will necessitate very little alteration in the generic characters assigned to the genus by Linne, the only alteration needed being the omission of the words "corolla monopetalous" and "capsule fleshy," and of course the addition of such details of structure as are omitted from the Linnean description.

In the above I have taken into account only those species enumerated by Linne in the first edition of his *Species plantarum*, because they alone are concerned in the founding of the genus. Yet if we examine the forty-five species enumerated in the second edition of that work, and the two others described in the tenth edition of his *Systema naturae* known to him, the conclusion above arrived at is in no way affected.

The rejected species I am referring to other genera.

(To be continued.)

Mesembryanthemum and some new genera separated from it.

Gard. Chron. III. 73: 272. 1925.

(Continued from page 232.)

Hitherto, when describing new species of *Mesembryanthemum* it has not been deemed necessary to describe in detail the structure of the flower, and that of the fruit is never described. In future, however, such details should be given, as it is often impossible to place a species in its proper position without knowledge of these details. For want of them there are some species described by Linne and many by later authors that I am at present quite unable to assign to any definite genus, because I have no material for the purpose, fruit especially being absent.

Fig. 109. Dry capsules of *Mesembryanthemum*: (a) *M. Heathii*; (B) *M. nilosulum*; (C) *M. Shandii*; (D) *M. longum* (?); (E) *M. ...*; (F) *M. ...*; (G) *M. ...*; (H) *M. species allied to M. Heathii*. All natural size.

Fig. 110.- The same capsules as in Fig. 109 when expanded by wetting; Natural size.

I have been more and more surprised during my examination of these plants that for more than a century and a half no one appears to have studied the structure of their fruit, and considering that these fruits are the most complicated in the Vegetable Kingdom, this is a rather remarkable circumstance. In every other natural Order the fruit is used for distinguishing genera, and it cannot be any longer ignored and treated as if of no generic importance in this group of plants. To see and be able to properly examine the fruit of these plants it is necessary to soak them in water for a few minutes to cause them to expand the valves, for unless they are expanded their structure cannot be seen. I have given an account of some of these fruits in the third article upon these plants in *The Gardeners' Chronicle*, 1921, V. lxx., p. 151, but here reproduce the figures of some dry (Fig. 109) and also expanded capsules (Fig. 110) to make my meaning clearer. When a fruit is placed in water or wetted by rain, the tissues absorb some of the water and it gets conducted to the expanding keels (Fig. 110 D, a) that extend along the valves. These are very hygroscopic and swell rapidly, and the lower part of the valves also must swell to some extent, and thus the valves are forced open and spread out flat or reflex. Sometimes, as shown at Fig. 110 H, the expanding keels develop broad-margined wings, which, when the fruit is dry, are folded or erect flaps, an example of which is somewhat indistinctly shown at Fig. 110 F. These flaps only occur in those genera that have axile placentation, and it would seem that in the closed fruit they more or less envelop the seeds, and in the act of expansion serve the purpose of

275 pulling the seeds off their funicles or stalks. And as all the genera of this group having axile placentations have open cells to the fruit, without cell-wings, the seeds are easily walled out of the cells by the rain. The fruit at Fig. 110 F. has axile placentas and open cells, the black spots shown being seeds. All the other fruits represented at Fig. 110 have their placentas on the outer wall or floor of the cells, and the cells are roofed with cell-wings as indicated on the fruit D at b, while at c of the same figure is shown the tubercle that nearly closes the opening of the cells, and seems as if designed to prevent the escape of the seeds. What is the purpose of this tubercle? In all the fruits I have been able to examine that have this tubercle, it is always accompanied by stiff (not thin and flexible) cell-wings, which still further tend to prevent the escape of the seeds. How do the latter get out of the cells? I have failed to solve the problem: the answer to this question must be worked out by some one in South Africa.

When the valves are expanded some of these fruits are very pretty, star-like or flower-like objects, as may be seen from their appearance in Fig. 110. On account of its flower-like appearance, I have even seen the fruit of one species sold in London under the erroneous name of "Rose of Jericho," a name that is also often misapplied to other plants that expand when wetted and close up when dry. The true "Rose of Jericho" will be found referred to later on in a note under *Cerhalophyllum dubium*.

A curious circumstance connected with the capsules of *Mesembryanthemum* is that in the year 1777 they were mistaken for fungi by Hagen, who, in the *Berlinische Sammlungen zur Beforderung der Wissenschaften*, V. i., p. 118, named the genus *Boletus*, containing three species, upon the capsules of different species of *Mesembryanthemum*. See Konic and Sims, *Annals of Botany*, V. i., p. 365 (1804).

This is not the place to enter into the details of the remarkable structure of these plants, but I may remark that certain combinations of structure possessed by them are usually associated with certain types of vegetative character. I have utilized the vegetative and fruit characters in combination in the following pages to divide the group into smaller genera. It must be understood, however, that my knowledge of the fruit of these plants is very imperfect, owing to my inability to obtain an abundant supply, yet where I have been able to examine the fruit of two or more species of the same group or genus as I now consider, the combination of characters as given seems to indicate that they will be conformable with all the species placed under each genus.

As the main purpose of a plant's life is to produce fruit, it is an accepted conclusion that the fruit is one of the most (if not the most) important of plant structures, and therefore where a general uniformity in its structure is found it indicates close relationship or common origin of the species have such structure. But where one or more of the organs of which the fruit is composed is undeveloped or suppressed or otherwise modified, it indicates a divergence from the relationship, and being usually accompanied by some difference in the flower structure or in the vegetative organs is regarded as of generic import. This is practically the basis upon which all large groups have been divided into genera, and is adopted here for the division of *Mesembryanthemum*, vegetative, floral and fruit characters all being taken into consideration.

And, judging from the seedlings of the few genera I have been

275 able to experiment with, I think that characters derived from the mode of development of seedlings should not be included, as they sometimes fail to confirm the assumed relation of two different genera. For example, when describing the genus *Limaria* that will appear later on in these articles I had judged its relationship to be near that of the genus *Lithops*, and when the few seedlings I was able to raise of it developed, this view was confirmed, for I found that their manner of development from the cotyledonary to the adult stage is the same as that of the genera *Lithops* and *Conophytum* and not all like that of *Sesuvium* and most other genera that I have been able to experiment with: thus adding a further character whereby it is distinguished from these genera.

As previously stated, I do not propose her to divide the whole genus *Mesembryanthemum* as now constituted into separate genera, nor to re-define its sections as I think they ought to be defined, because I have not access to, nor can I obtain, the material necessary for this purpose, fruit and seed, and often sufficient flowers for dissection being absent. Nor do I wish intimate that I think every group into which the genus is now divided should constitute a genus. But I do think, as Haworth over one hundred years ago stated, that several among them are undoubtedly good genera, and I here propose to separate and characterise as distinct genera some of the groups of which I have been able to examine living plants or adequate dried material, and thus have assured myself that they undoubtedly differ in structure and habit from the main characters assigned to the genus by Linne. Most of the genera described below are easily recognised at sight when out of flower by their habit alone, when once they are known, an advantage not possessed by the majority of genera in other Natural Orders.

Therefore, in constructing the key to the genera given below, I have considered vegetative characters (next to fruit characters) as of first importance, because they are always associated with a distinct floral and fruit structure, and are always present, while flower and fruit are not always obtainable.

In writing of these plant I have also endeavoured to make the descriptions so that they can be understood by the average gardener as well as by the botanist, because I realise that there are large numbers who cultivate these plants that have no means of identifying any of them, and therefore these articles, if very carefully studied, may be of some help to those who have not access to the rare books in which these plants are figured and described. At the same time it is impossible for me to here deal with all the known species, or even with all that are in cultivation, but in many cases I have given descriptions of some or all the chief species known or in cultivation, in others I can only enumerate them, and in the case of the vast genus *Mesembryanthemum* only a selection of a few kinds can be made.

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 78: 412. 1925.

Continued from page 273.

KEY TO THE GENERA.

[11. B.-- As this key only includes genera founded upon such material as I have been able to investigate, it must be understood that there still remains under *Lesembryanthemum* species that do not conform to the characters of any genus as here defined, and which I believe will ultimately be removed from that genus.

Also, as it may happen that cultivators and others using this key will desire to discover the genus of some particular member of this group of plants that has neither flower nor fruit upon it, I have endeavored to make this achievable, as far as I am able to do so, by giving particular prominence to the vegetative characters, and have contrasted them throughout for that purpose. There are some genera, however, such as *Lananthus*, *Erepsia*, *Aridaria*, *Dolophrum*, and *Lesembryanthemum* that cannot be distinguished by their vegetative characters alone. Many genera, then in leaf only, will, I think, be readily recognized by a careful perusal of the characters given, and when once recognized by their habit and appearance other unknown species can readily be referred to them. Where the word "apparently" is used it indicates that I have only seen dried or withered flowers.]

A. Annuals with flat, linear, terete or semiterete leaves, or perennials with flat and thin leaves only. To end of paragraph under 12.

1. Leaves either all alternate or the lower opposite and those on the flowering branches alternate, sometimes mingled with a few that are opposite; calyx produced above its union with the ovary into a short tube or cup; petals united into a short tube at the base; ovary partly superior, 4-5-celled; placentas on the central axis 2

Leaves all opposite 3

2. Capsule (when expanded) with 5 erect bifid valves, giving it the false appearance of being 10-valved. Annual with prostrate, very watery stems and branches 4-6 lines thick; leaves very stout, terete 19, *Hydrodea*

Capsule (when expanded) with 4-5 entire, spreading or reflexed valves. Annuals with flat or subterete and then not very stout leaves 17, *Cryophytum*

3. Ovules and seeds arising from the central axis 4

Ovules and seeds arising from a placenta down the middle of the outer wall or floor of the cells; flowers solitary; ovary inferior; capsule opening by valves having contiguous or closely parallel expanding keels 11

4. Fruit inferior, indehiscent, without valves, 1-celled; seeds large, flat and broadly-winged all round, arranged in a single whorl around the central axis. Annuals with radical flat leaves 5

Fruit (and ovary) partly superior or rarely wholly inferior, 4-5-celled, opening when vetted by 4-5 spreading or reflexed valves, with their expanding-keels (except perhaps in 20, *Platythyra*) closely contiguous

so as to form one central acute keel; cells open, without cell-wings or with a tubercle at the opening; seeds small, not flat nor winged, irregularly arranged in the cells; two calyx-lobes often much larger than the others and leafy

6

5. Style either none or very short and the 8-12 stigmas long and filiform, or the style rather long and slenderly conical with several (7 or 8?) minute linear stigmas at the apex 28, *Thyrasperma*

Style funnel-shaped, somewhat membranous, with 9-12 papillose-like stigmas on the surface of its rim 28, *Hymenogyne*

6. Leaves flat and more or less distinctly petiolate or much narrowed into a sort of stalk at the base 7

Leaves sessile 9

7. Flowers solitary and axillary or in the forkings of the branches; stigmas and valves of the fruit four 8

Flowers in terminal cymes or cymosely arranged; leaves often very large. Annual or biennial plants 17, *Cryophytum*

8. Leaves ovate-lanceolate or lanceolate; calyx produced above the ovary into a short tube; stigmas stout; valves of the capsule with inflexed marginal flaps forming nockets, and with the expanding-keels thin, deep and toothed 20, *Platythyra*

Leaves cordate; calyx lobed down to its union with the ovary; stigmas minute; valves of the capsule without wings or flaps, and their expanding-keels neither thin and deep nor toothed 21, *Aptenia*

9. Leaves flat, broader than thick; flowers terminal and solitary or in few or in many-flowered cymes 10

Leaves subterete or semiterete, not or scarcely broader than thick; very dwarf erect annuals with distinct inter-nodal joints; flowers solitary or cymose; stem and leaves stout and probably pulpy 24, *Opophytum*

10. Perennials; leaves under natural conditions withering to a skeleton and persisting, several times broader than thick; valves of the capsule without wings or flaps 22, *Sceletium*

Perennials; leaves not withering to a skeleton, moderately thick in proportion to breadth; valves of the capsule with large erect or inflexed flaps 18, *Prenia*

Annuals, leaves not withering to a skeleton, many times broader than thick; valves of the capsule with inflexed flaps 23, *Synaptophyllum*

11. Annuals; leaves more or less flat and petiolate or linear-terete

12

Perennials; leaves sessile, lanceolate or linear-lanceolate; stigmas and cells of the ovary and fruit 5; capsule with the exaranding-keels of the valves with membranous marginal wings at their apical part; cells open, no cell-wings or tubercles 38, *Delosperma*

12. Stigmas and cells of the ovary and fruit 5; capsule with the exaranding keels of the valves ending in broad membranous wings; cells open, without cell-wings or tubercles 30, *Cleretum*

Stigmas and cells of the ovary and fruit 12-20; valves of the capsule with the exaranding-keels ending in awns; cells roofed with stiff cell-wings, without a tubercle at the narrow opening 27, *Carpenthea*

- . Plants all perennials, except perhaps one species of 26, *Conicosia*, which may be biennial or of short duration, and one species of 42, *Erepsia*, which may be annual; leaves terete, semiterete or 3-angled, rarely flattened and then rather thick and fleshy, never flat and thin. To end of key.

13. Plant or each division of it without separate spreading leaves, and consisting of a small-fleshy body, entire, notched or with two separate or contiguous lobes at the top, or with a closed out-like fissure at the top or on one side, separating the two short thick and obtuse leaves of which it is composed and which normally only separate when making a new growth or in flower; plants usually stemless or nearly so; placentas down the centre of the outer wall or floor of the cells of the ovary and fruit. 14

Plants with distinct, separate, erect, ascending or spreading leaves, only in 8, *Cheiridopsis* do the resting or younger pair of leaves persist for any length of time with their flat faces closed together, and then are acute and resemble the beak of a bird 18

From 13. Plants all with distinct erect, ascending or spreading leaves (to the end).

14. Cells of the capsule open, without cell-wings; stigmas and cells of the inferior or partly superior ovary and fruit 4-7 15

Cells of the capsule roofed with cell-wings; calyx without any tube above the ovary, which is always inferior, with 6-15 stigmas and cells 17

15. Ovary and fruit inferior 16

Ovary and fruit partly superior. Each body or division of the plant ovoid or cylindric-ovoid with a small fissure at the apex, minutely repulose; calyx with a very short green tube above the ovary; petals apparent-

ly united into a very short tube at the base

2, *Corythum*

16. Calyx with a distinct membranous tube above the ovary petals united below into a distinct tube. Each body of the plant globose, obconic, ovoid or oblong, entire, notched or distinctly 2-lobed at the top, with a small closed orifice at the centre of the top or between the lobes, not papulose 1, *Conophytum*

Calyx lobed down to its union with the ovary (no tube); petals free. The plant or each division of it somewhat obconic, flat or slightly convex at the top, with a transverse fissure all across it (when adult), dividing it into two short truncate lobes 3, *Lithops*

17. Calyx subequally 5-9-lobed; petals free; stigmas and cells of the ovary 8-15. Each plant or division of it globose, obconically sub-globose or oblong-ovoid, formed of two short, thick equal or sub-equal leaves with their flat faces closely pressed together and separated only by a cut-like fissure, not dotted or otherwise marked 4, *Amaria*

Calyx subequally 6-lobed; petals free; stigmas and cells of the ovary 6-7. Each division of the plant either ovoid or obovoid and slightly notched on the top, or obliquely or conically-ovoid or sub-cylindric with a closed mouth-like fissure on one side of it. 5, *Gibbaeum*

18. Seeds and ovules arising from a central axis, not flat nor winged, fruit partly or nearly superior, opening when wetted by 4-5 valves, and with 4-5 open cells without cell-wings or tubercles; petals united into a short tube at the base 19

Seeds and ovules arising from a placenta down the centre of the outer wall or floor of the cells, or in the genera 6, *Argyroderma*, 11, *Lunularia* and 12, *Glottiphyllum*, also from the basal part of the central axis, not flat nor winged; petals mostly free, but in a few genera united into a tube at the base 27

19. Leaves all or many of them (at least on the flowering branches) alternate 20

Leaves all opposite 24

20. Leaves with a distinct closed tubular sheath embracing the stem 21

Leaves without a tubular sheath 22

21. Stem very short and completely concealed by the stout leaf-sheaths that close it; leaves 2 to each growth,

pulpy, terete, 4-6 lines thick; petals stiff

13, *Doctylopsis*

Stem evident between some of the leaf-sheaths, erect,
4-6 inches long, with more than two alternate and
opposite leaves spaced along it; petals not stiff

14, *Aspizoma*

22. Plants with distinct, erect, decumbent or prostrate
stems or flowering branches

23

Plants quite stemless; rootstock tuberous, leafless
part of the year; leaves terete; flowers subsessile
or very shortly pedicellate

31, *Phyllobolus*

H. E. Brown

(To be continued.)

MESEMBRYANTHEACEAE

Gard. Chron. III. 78: 433. 1925.

(Continued from page 413.)

23. Stems or flowering-branches erect, stout; leaves wither-
ing and persisting as sharp spines, or (on dried
specimens) their bases persisting as hard fragments;
flowers in terminal cymes; calyx-lobes with spine-
like tips or acuminate

15, *Amoebohyllum*

Stems decumbent or prostrate from a tuberous or fleshy
rootstock, not stout; leaves sometimes withering into
spines; flowers terminal and solitary or becoming
lateral and scattered along the branches opposite the
leaves

16, *Sphalanthus*

24. Leaves small and united at the base into a short sheath
bearing a ring of deflexed hairs or cilia, with the
free part subulate, subterete or deltoid, very dwarf
bushy plants, densely branched

36, *Trichocyclos*

Leaves sessile, without a ring of deflexed hairs or
cilia at their base

25

25. Bushes or bushily branched plants, erect or in a few
species decumbent; internodes evident on all parts;
leaves terete, semiterete or trigonous, withering and
often deciduous and leaving naked stems

26

Not bushily branched plants; flowering-branches decumbent
or procumbent, or the whole plant prostrate; internodes
of the main stem often quite absent; leaves linear-
lanceolate or flattish, or in some species subterete

18, *Trenic*

26. Corolla small, usually 3-6 (rarely up to 9) lines in
diameter; seeds very small, $\frac{1}{4}$ - $\frac{1}{3}$ (rarely $\frac{2}{3}$) line in
diameter, nearly smooth or minutely granulate

35, *Psilocaulon*

Corolla showy, 9-20 lines in diameter; seeds 4 to nearly

1 line in diameter, compressed, crested-tuberculate on
the margin 37, *Aridaria*

From 18. Placentas on the outer wall or floor of the cells
(to end.).

27. Leaves all alternate, arranged in large or small tufts,
not dotted 28

Leaves all opposite 29

28. Leaves $\frac{1}{2}$ -1 inch long, 5-9 in a tuft, erect, convexly-
truncate and without chlorophyll at the apex*,

* This can easily be seen by cutting off the top of a leaf and
holding it against the light.

slightly tapering downwards; flower sessile or sub-
sessile, purple; stigmas 5 33, *Trithia*

Leaves 3-9 inches long, narrow, acute, soft; flowers ped-
icillate, large, yellow; stigmas 10-20 26, *Conicosia*

29. One leaf of each pair much longer and larger than the
other, united at the base into a solid-looking body,
usually only 1-2 pairs to a growth, and the plant stem-
less or with short prostrate stems; stigmas 6-7
5, *Gibbacum*

Leaves of each pair about equal in length and size 30

30. Leaves all radical, erect, tufted, club-shaped, convexly-
truncate and without chlorophyll (green colouring
matter) at the apex*;

* This can easily be seen by cutting off the top of a leaf and
holding it against the light.

flowers large, showy; stigmas 10-11 32, *Fenestraria*

Leaves not or very rarely club-shaped, never truncate
nor without colouring matter at the apex; flowers and
stigmas variable 31

31. Fruit indehiscent (no valves), fleshy, edible; stems ter-
tiline; leaves acutely trigonous; flowers large, showy;
stigmas 10-18. 43, *Carpobrotus*

Fruit a dry capsule opening when wetted by spreading or
reflexed valves provided with expanding-keels 32

32. Stigma one, sessile, circular or oval (not so in any other
genera). Stemless or without internodes between the
leaf-pairs leaves 2-4 to a growth, very smooth, dotless

- stamens all, or the inner, bent down into the calyx-tube; ovary and fruit 10-24-celled and the cells of the fruit nearly closed by a large tubercle at the opening 35
- Stigmas and cells of the ovary and fruit 4-20; stamens erect and visible in all except 41, *Ficuetis*, and 42, *Trensia* 34
77. Leaves not more and usually less than twice as long as broad, ovate to oblong, flat above, white or whitish; flower sessile or subsessile 6, *Argyroderma*
- Leaves several times as long as broad when adult, erect, semiterete, not white; flower on a pedicel half as long as the leaves 7, *Roodia*
78. Stemless plants without internodes, with 1-2 pairs of short, thick, ovate leaves, from broader than long to about twice as long as broad, grey-green or brownish, dotted, flowers large and showy 35
- Plants either with distinct internodes between some or all of the leaf-pairs, or without internodes and with leaves (which are never ovate) three to several times as long as broad 36
79. Flowers terminal and central between the leaves, stigmas 0-14, 9, *Eleiospilos*
- Flowers lateral, one on each side of the plant from the axils of old leaves; stigmas 6 10, *Didymaotus*
80. Cells of the capsule open, without cell-wings, exposing the seeds, no tubercle at the mouth of the cells; branches decumbent or prostrate and often forming matted clumps, or stemless with branching tuberous rootstock; leaves soft, minutely or distinctly papulose, green, without radiating bristles at their tips; stigmas 5 38, *Delosperma*
- Cells of the capsule roofed with cell-wings 37
81. Cells of the capsule partly closed by a large tubercle at the opening, which in 25, *Cephalophyllum*, is partly hidden by the cell-wings; stigmas 5-20 38
- Cells of the capsule without a tubercle at the opening; stigmas 4-10 42
82. Stigmas, valves and cells of the fruit 5; expanding-keels of the valves widely separated (nearly 1 line apart) at the base, diverging; tubercle at the opening to each cell two-lobed (not so in any other known genus); stems prostrate, with distinct internodes 39, *Disphyma*
- Stigmas, valves and cells of the fruit 8-20 (in

* I cannot obtain fruits of this plant but believe it to be wrongly placed under Glottiphyllum.

- closely together at the base or not widely separated there; tubercle at the opening to each cell entire 59
39. Leaves soft and pulpy and not dotted, long, strap or tongue-shaped and entire, or subterete with or without two blunt teeth on the face, grass-green or yellowish-green; flowers large, yellow; stigmas 7-10
12, Glottiphyllum
- Leaves firm, pellucid-dotted or with usually conspicuous dark or white dots, rarely (and only in 8, Cheiridopsis) entirely white without dots; stigmas 8-20 40
40. The inner or only pair of leaves present on each growth when the plant is at rest erect, acute, closed together and somewhat resembling a bird's beak, and surrounded by or their basal part enclosed in a sheath formed by the withered united part of the previous pair, conspicuously dotted, rarely white without dots; stigmas 8-19 8, Cheiridopsis
- Leaves when the plant is at rest spreading or not closed together as to resemble a bird's beak, and the basal part not enclosed in a withered sheath 41
41. Leaves in 1-3 pairs to a growth, elongated, spreading, very stout, obtuse without internodes between the pairs, greyish-green or brownish, conspicuously dotted with a darker colour; stigmas 9-18 11, Functillaria
- Leaves ascending or spreading, crowded or in tufts or, on the flowering-branches, with distinct internodes between the pairs, subterete or triconous, not stout, finely pellucid-dotted when held against the light, stigmas 10-20 25 Cerhalophyllum
42. Stigmas and cells of the ovary and fruit normally 5-6, rarely 4 or 7. Plants sometimes stemless, but mostly with erect or prostrate branches with distinct internodes between the leaf-pairs 43
- Stigmas and cells of the ovary and fruit normally 7-10 44
45. Stamens evident, erect, loose or collected into a column or cone, with or without staminodes around them; column not produced above its union with the ovary into a tube or ear; petals not talked 40, Mesembryanthemum
- Stamens nearly or quite hidden under a mass of inflexed

sterinodes and incurved or bent down into the short calyx-tube that is produced above the ovary; petals linear-striate or cuneately linear 42, *Erpsia*.

44. Very dwarf stemless plants with thick subfleshy root-stock and with the leaves in tufts of 2-6 pairs to a growth, dotted, without internodes between them; flowers sessile or subsessile, stamens conspicuous, erect 54, *Nananthus*

Shrubby plant with distinct intervals between the leaf-pairs; calyx produced into a broad cup above the ovary; petals with long stalks and small obovate or elliptic blades; stamens hidden under a dome of in-arched staminodes and petals 41, *Aiquetic*

V. B.-- In reference to the above key, as it has been found that more usual type of key would have involved the loss of a great deal of valuable space, the above type has been adopted, although it is not so clear or easy to use. To those who are not accustomed to this kind of key it may be useful to explain that

the group A or group B. Supposing the plant in question has flat leaves, it will belong to group A. Then turning to the coupled and numbered paragraphs, beginning at number 1, it is found that if the leaves, or some of them, are alternate, the reader must refer to the coupled paragraphs number 2, as indicated by that figure on the right hand side of the text, under which two genera are found characterised (*Hydrodes* and *Jrjorhytum*), and from the contrasted characters there given the genus can be ascertained. But if the leaves are all opposite we are directed to the couplet number 3, and again from that couplet to couplets 4 and 11 respectively, and so on, until the genus is found by the characters that fit the plant. The number before each generic name indicates the numbered position of the genus in the sequence adopted.

H. E. Brown

(To be continued.)

MESEMBRYANTHEMUM

Gard. Chron. III. 72: 450. 1925.

(Continued from page 433.)

CONOPHYTUM, H. E. Brown

Very small perennial, succulent, tufted plants, usually stemless, but a few species develop short stems with age, with the growths crowded into a clump. Roots very short. Each growth consists of a small, fleshy body, obconical, globose, ovoid, oblong, or sub-cylindric in shape, formed of two opposite leaves fused into one body, and convex, flat, depressed, notched or two-lobed at the top, with a small orifice resembling a closed mouth at the centre or between the lobes. Flower solitary, growing up from the interior of the growths through the central orifice. Calyx with a distinct elongated, slender, membranous tube above the ovary, four-to-six-lobed at the top, included in or partly or entirely exerted from the orifice. Corolla with a distinct slender or funnel-shaped tube as long as or longer than the calyx-tube, and

450 usually numerous, sometimes few lobes or petals, spreading or recurved, in one to several series, the inner series at the mouth (staminodes?). Stamens, few or many, erect included in or partly exserted from the corolla-tube. Style, long or short, rarely nearly or quite absent; stigmas four to six, filiform. Ovary inferior, flat or convex or conical at the top, with a crenulate rim of connected lobes at its margin, four-to-six-lobed; placenta on the floor or outer wall of the cell. Capsule small, with four to seven valves and cells; valves with a central expanding-keel continuous with the cell-partitions; cells open, without cell-wings or tubercles. Seeds minute, ovoid, with a nipple at one end, smooth.-- N. E. Brown, in *Gardeners' Chronicle*, 1922, vol. LXXI., p. 198.

Species numerous, all natives of the forest region of South Africa, ranging from Great Namaqualand southward and eastward as far as the Indian Ocean, but not extending to the east of the Orange River beyond those limits.

The name is derived from the Greek konos, a cone, and phyton, a plant, in allusion to the shape of the growths, which in most of the species is like an inverted cone.

Many of the species expand their flowers at the close of the day or at night, closing again in the morning, and when their flowers at the close of the day or at night, closing again in the morning, and when their flowers are white, cream-coloured and yellowish, they always have very narrow or linear-filiform petals, but when the petals are pink or magenta they are usually much broader. Those that expand their flowers in the day-time always have broader petals than the night-flowering species, irrespective of colour. Why is this? Why do after day-flowering species need to make themselves more conspicuous than those that flower at night? Some of the night-flowering kinds are scented, but so also are some of those that are day-flowering, so that a difference in the attraction of odour does not seem to explain the problem. I know that nothing of how or by what insects these plants are fertilised, but from observations made in my own greenhouse, I am inclined to believe that mites, thrips and similar minute insects are among the chief agents.

In my original description of the genus at the place above quoted, I described the cells of the capsule as "with or without cell-wings." This is an error, based upon the fact that the capsule of the plant I described as *C. pilosulum* has cell-wings, but I had not then seen a flower of that species, only a photograph of it, which is useful for structural details. Last year, however, the plant flowered at Kew, and Dr. J. Muir has this year sent flowers of it to me from South Africa, and now that I have been able to examine its blossoms, I find that the floral structure of *C. pilosulum* is quite different from that of *Conophytum*, and identical with that of *Gibbaeum*, and the important character of the presence of cell-sinns also agrees with the fruit-structure of that genus, under which this plant will be found enumerated hereafter. The appearance of the plant, however, is so much like that of *Conophytum*, that I think no one would have suspected that it did not belong to that genus. But it also possesses another character that should have warned me, for in place of the very short fibrous roots characteristic of the genus *Conophytum* it has the deeply descending rootstock characteristic of the genus *Gibbaeum*.

It was not until some time after my last article on these

450 plants, in The Gardeners' Chronicle, 1922, vol. LXXII, p. 124 was in type (but not published) that I was informed by Mr. J. Schwantes that he had published several species in the Monatschrift für Kakteenkunde after the war, and he very kindly sent me copies of his articles, for no copies of this work published after the war began, was contained in the Her Library until the spring of 1922, long after my account of the genus was in type, so that until then I was quite unaware that any other species had been published belonging to the groups I have dealt with, other than those I have enumerated. As some of Mr. Schwantes' names were published at an earlier date than my own, a few changes of nomenclature are necessary. These changes I have made in the following enumeration, and have also added some further references, as well as descriptions of the genus up-to-date. The species are arranged alphabetically for convenience of reference, but numbers are added to indicate their position in the arrangement adopted in my previous account of the genus.

Although several new species have been described by German authors, they do not recognise this genus as distinct from Mesembryanthemum, nor do they describe the structure of the flowers and fruit.

In the correspondence about these plants some writers have mentioned that the surface of many of these plants when viewed with a strong lens is seen to be covered with minute whitish dots, which I have not mentioned in my descriptions. The reason I have not done so is because these minute specks are the stomata of the plants, which it is unnecessary to mention.

Those who are interested in the microscopic structure of plants will find the epidermis of these species very interesting to study.

As stated in The Gardeners' Chronicle, vol. LXXI, p. 198, these plants are wanting in characters that can be set down in writing in definite terms, and are, therefore, scarcely to be identified from descriptions alone, and, unfortunately, owing to the illness of my daughter, I am no longer able to illustrate these articles by the aid of her excellent photographs, that often had to be made between 8 and 10 p.m., by gaslight, as many species only fully expand their flowers at night. But as an aid to the identification of the new species I have seen, I have indicated under each of the type of form assumed by the growths when viewed sideways, as indicated in the outline drawings (Fig. 10) to accompany the former article in The Gardeners' Chronicle, vol. LXXI, p. 214.

The difficulty of naming these plants correctly is very great, as is clearly evidenced by the fact that at the horticultural shows where I have seen them exhibited, I have noticed that the names are rarely correct, and continental nurserymen are selling some species with my names attached to them that are by no means correct. As for an example, I have seen a plant bought from a continental dealer as being "*C. pictum*, H.E.Br.," which it certainly is not, but appears to be *C. signatum*, H.E.Br. Another I have seen bears the name "*C. cibdelum* H.E.Br." In the first place, it is a mystery to me how the dealer could have possibly obtained this name, for it has hitherto remained unpublished, existing only in my own manuscript, and I have never distributed any portion of my plant as far as I am aware, under that name, nor have I so named a plant for another person. Secondly, the plant sold under the name "*C. cibdelum*" is not at all like the plant I have so named, and which will be found described below. I possess the plant, and think it probable

450 that it may be a variety of *C. vagum*, but until I am able to compare its flowers I cannot decide.

I have mentioned this because it indicates how very difficult it is to name these plants from descriptions. Unfortunately, as previously stated, I have found it impossible to make a workable key to the whole of the species, but I have compiled one to the group to which *C. bilobum* belong, from which I think the species of that group at present in cultivation may be determined. And I have separated the newly described species that belong to that group, and have placed them after the key at the end. Descriptions of the older species of the group will be found in vol. LXIII, pp. 83 and 124.

For the cultivation of these and allied plants I am now making trial of some porous pots without a hole at the bottom, manufactured by Mr. R. T. Die, of Newlyn, Penzance. Under natural conditions these plants get little or no rain, for long periods and it is clear that they must obtain the moisture they require from another source. I think it probable that the plants and the stones and rocks among which they grow, cool down at night and condense sufficient moisture for their requirement. But under cultivation the problem is to give them the right amount; the watering of them is a fine art. If kept dry too long, the root tips die, and when watered often, rot, and the plant is killed. And if too liberally watered, especially at the wrong period, they may also rot and die. These porous, holeless pots may therefore absorb and retain sufficient water to prevent the roots from dying completely, and at the same time allow any surplus to evaporate and so prevent rot. I will report upon the result of the trial I am making when I treat of the general cultivation of these plants. At present, it may suffice to say that the species

451 of this genus flower and make their growths of this country between August and January, and from May to near the end of July they go to rest. During their resting period they require very little water, but when growing and flowering they should be watered freely enough to keep their roots active, otherwise they do not flower well.

39a.-- *C. advenum*, N.E.Br. Growth small (type E)., 2-4 lines thick, 2-3½ lines broad, and 1½-2½ lines thick, obconically obovoid, slightly notched at the convex top, which in end view is also convex or faintly ridged; orifice, ¾-1 line long; surface smooth, glabrous, grey-green, suffused with purple on the sides under continued sunshine, and on other either marked with a line of connected dots over the top transverse to the orifice and numerous other separate scattered dots, or only with irregularly scattered dots of dark green or purplish-brown, and the orifice outlined with similar brown, and the confluent dots. Flowers not seen. Montrose Division; locality not stated. Mitchell I received this small species from Professor H. Compton in 1919, but it has not yet produced flowers with me.

15c.-- *C. Angelicae*, N. E. Br.-- Growth small, 3-4 lines high, 1½-2½ lines broad, obconic, more or less circular or very broadly elliptic at the truncate top; orifice about 2/3 line long; surface green, marked with some elevated branching pale green.

in Zeitschr., f. Sukk., vol. II, p. 27 (1935). Great Namaqualand; Tendorf, near Warmbad, Dinter. I have not seen this species.

40a.-- *C. assimile*, N. E. Br. Growths 5-7 lines high, 4½-6 lines broad, and 3-5 lines thick, obconic, elliptic in outline and slightly notched on the top (type C), with the lobules on each side of the notch convex in side view; orifice 1-1½ line long, depressed; surface smooth, glabrous, greyish-green, or, in dull summers, dull green, under continuous sunlight often purplish on the sides, and the top usually marked on each side of the orifice with two arched lines of confluent dots, with or without a row of two-four dots proceeding from the point of union of the arches towards the centre of the orifice, and with a few dots or irregular lines outside and the arched lines, and the orifice outlined with a few separate or confluent dots, all of dark green or purplish. Sometimes when exposed in the open air to continuous sunlight, the whole top surface becomes more or less thickly covered with purple confluent dots, hiding the other markings, possibly the effect of exerted; lobes oblong, obtuse, reddish. Corolla, 7-10, lines in diameter, expanding at night, scentless, tube 2½-3½ lines long; petals 4-5 lines long very slender whitish. Stamens many, in about three series; anthers of the upper series exerted, milk-white. Style 1-1½ lines long; stigma 4, much shorter than the stamens, 1-1½ line long, filiform, whitish.-- *N. assimile*, N. E. Br. in Journ. Linn. Soc. vol. XLV, p. 92. South Africa; locality and collector unknown.

This species was accidentally omitted from my descriptions of the species in my former articles in *Gardeners' Chronicle* where it should have been found place in vol. LXXXII, p. 54.

H.B.-- In the key to the genera published on p. 413, at the top of the column one, the paragraph "From 13. Plants all with distinct erect, ascending or spreading leaves (to the end)" has been misplaced in the margin and should be transposed to immediately before the paragraph numbered 18. The plants dealt with in the paragraphs numbered 14-17 all have their leaves more or less combined into a solid body, not separate, as is stated in the first of the coupled paragraphs numbered 13.

H. E. Brown

(To be continued.)

MESSEMBRYANTHERION.

Gard. Chron. III. 78: 462. 1925.

(Continued from page 404.)

[451.]

19a.-- *C. Batesii*, N. E. Br.-- Growths varying from 4 lines high and 1½-3 lines in diameter at the circular top, to 6-8 lines high, 3-6½ lines broad and 2½-5½ lines thick, obconic, varying from nearly circular to elliptic in outline at the top, which is regularly convex and not at all depressed at the centre (type C); in sunshine from its pallid or somewhat whitish appearance, its lips rising to the summit of the top; surface smooth, glabrous, grey-green, rather faintly marked with a few lines of dots and very few separate scattered dots of darker green; in the larger and more perfectly marked growths there are usually 3-5 radiating lines of dots on each side of the orifice, and a few scattered dots or short lines in the region at each end of the orifice. Calyx 4-lobed, reddish; tube 2½ lines long, partly exerted; lobes 3/5-

468 1 line long. Corolla 5-6 lines in diameter, expanding at night; tube 3-3½ lines long, whitish; petals, 25-30, lax, about 3 lines long, and 1/5 line broad, linear-filiform, pale creamy-yellowish. Stamens about 3 series at the mouth of the corolla-tube and exserted; anthers yellowish. Style about 4 lines long, stigmas 3-4, about 1 line long, filiform, attaining to about the middle of the corolla-tube, far below the anthers, pallid. Top of the ovary shortly and broadly conical. South Africa; locality and collector unknown. Described from a living plant in the collection of Mr. J. T. Bates, of Hounslow, after whom I have much pleasure in naming it, and who obtained it from Mr. E. Taylor, of Southborough, Kent, without information as to origin.

7a.-- *C. breve*, N. E. Br.-- Growths as first developed after importation, 3-4 lines high and 3-4 lines in diameter, obconic, flattish or flattish-convex and circular in outline at the top (type E); orifice 1-1½ line long, scarcely depressed, glabrous, smooth, pale glaucous-green, with a few indistinct dots of a darker tint scattered over the top. Calyx partly exserted, 5-6-lobed, red-fish; tube rather short and stout, 1 line long, and 1 line broad; lobes 1-1 line long, oblong or ovate, obtuse. Corolla (only a dried flower seen) apparently about 4-5 lines in diameter tube moderately stout, 1½ line long, not exceeding the calyx; petals not very numerous, apparently in one series, 1½ line long, linear, clear yellow. Stamens about twenty, all exserted arising at the middle of the corolla-tube, about 1 line long; anthers light yellow. Glands united into a pale honey-coloured ring. Style none; stigmas 4-5, erect, 1 line long, filiform, apparently yellowish. Top of the ovary very prominent and convexly conical. Little Namaqualand; near Steinkopf, Meyer, Harloth 6,513.

This species is allied to *C. minutiflorum* and *C. ragesse*, and all being exserted and the more prominent top of the ovary very well distinguish it.

6.-- *C. calculus*, N. E. Br., in Gard. Chron., 1922, vol. lxxi, n. 231. To this add reference --*C. calculus*, Schwantes in Monats-schr. f. Kakt., Sept., 1920, n. 131.

22a.-- *C. cibelum*, N. E. Br.-- Growths 6-9 lines long (probably much shorter and smaller under natural conditions), 3-5 lines broad, and 3-4½ lines thick, obconic, broadly elliptic or circular in outline at the top, in side view the top is convex with a rather narrow and somewhat cutlike notch at the orifice (type E), and in end view the top is very obtusely ridged; orifice 1-1½ line long, with a much impressed dimple at each end of it; surface smooth, glabrous, green, turning grey-green under continuous sunshine, plentifully sprinkled with separate small dots of a darker green, which are more or less connected, and the whole with a similar separate or connected dots. Flowers not seen. South Africa; locality and collector unknown.

Although I have had this plant in cultivation for nine years it has never flowered during that period. Viewed from above it somewhat resemble *C. truncatellum* on a small scale but differs from that species by its growths being constantly of only about half the diameter of those of that species, of a more grass-green colour, and the orifice is not depressed as it is in *C. truncatellum*.

15a.-- *C. discor*, H. E. Br.-- Growths very variable in size, 2-7 lines long and 2-6 lines in diameter, obconic, usually nearly circular in outline and somewhat flattened and obscurely ridged on the top (type F.). with the orifice 1-2 lines long, depressed in a slight notch, with a dimple at each end of it; surface smooth, glabrous, purplish on the sides under continued sunshine, and the top green, marked with numerous separate dots of darker green irregularly scattered over it, and with or without some of them arranged in narrow longitudinal series; sometimes the surface is marked with or broad figure-of-eight marking around and distant from the orifice, and the orifice itself outlined with similar connected dots. Calyx 5-6 lobed; tube partly exerted, $1\frac{1}{2}$ line long, whitish; lobes 1 line long, oblong, obtuse, reddish. Corolla about 3-7 lines in diameter, expanding in the veining; tube 2 lines long; petals twenty or more, in 1-2 series, about 3 lines long, $1\frac{1}{5}$ line broad, slenderly linear, acute, whitish. Stamens about as many as the petals, in about two series, arising at or above the middle of the corolla-tube; anthers all exerted, pale yellow. Style scarcely greenish, attaining to about the middle of corolla-tube. South Africa; locality and collector unknown.

Described from a living plant sent to me several years ago by Mr. E. Taylor, of Southborough, Kent.

38a.-- *C. ectyrum*, H. E. Br.-- Growths as first developed after importation, 7-8 lines high, $2\frac{1}{2}$ - $3\frac{1}{2}$ lines broad, and $2\frac{1}{2}$ -3 lines thick, obovoid, rounded or faintly notched at the top (intermediate in type between C and A), circular or broadly elliptic in outline viewed from above, with a slightly depressed and gaping orifice $\frac{1}{2}$ -1 line long; surface glabrous, green, with the orifice outlined with a slightly raised smooth line, and from or about which radiate over the top and partly down the side several other slightly raised smooth lines or irregular markings, and occasionally a dot in between them, all of which are of a darker green than the rest of the surface or perhaps under continuous sunshine become purplish if the surface in between these markings when viewed with a lens is seen to be rather conspicuously covered with minute white specks (stomata). Calyx much exerted (only a dried flower seen), 4-lobed; tube $1\frac{1}{2}$ line long, membranous, whitish; lobes 2 line long, reddish. Corolla apparently about 5-6 lines in diameter; tube much exerted from the calyx, 3 lines long, yellowish; petals apparently not very numerous, $2\frac{1}{2}$ -3 lines long, linear, roseate. Stamens in three distinct series of about eight in each series, one at about the level of the calyx-lobes, one at the mouth of the corolla tube and the third series midway between these two; anthers yellow. Style 1 line long, attaining to the level of the lower stamens, with four minute filiform stigmas at its summit, Little Namaqualand; near Stienkorf, Meyer, Herloth, 6,365b.

Described from a living plant kindly sent to me by Dr. A. Herloth.

H.E.Brown

(To be continued.)

1732-1733-1734-1735.

Gard. Chron. III. 73: 464. 1925.

(Continued from page 433.)

45.-- *C. ficiforme*, H. E. Br., in Gard. Chron., 1922, v. 72, p. 54, f. 26. Add to reference, *C. ficiforme*, Schwanter in Monatssch. f. Kakt., September 1920, 131.

56.-- *C. gracilistylum*, N. E. Br., in Gard. Chron., 1922, vol. 72, p.124. Add to synonymy, *C. Chauviniae*, Schwantes in Monatshefte., f. Kakt., May. 1920, p. 77, with fig., and *C. engeliforme*, Schwantes in the same volume, p. 78.

Mr. Schwantes having kindly sent to me a portion of his type of *C. Chauviniae*, I find it identical with *C. gracilistylum* (a name first published in 1913). He also informed me that he also believed his *C. engeliforme* to be the same plant, but that it has now entirely died out of cultivation. As one of my plants of *C.*

Chauviniae is "obovate, terete, globose above and about one cm. thick," as described by Mr. Schwantes for *C. engeliforme*, I have no doubt that he is perfectly correct in believing *C. engeliforme* synonymous with *C. gracilistylum*.

13a.-- *C. inornatum*, N. E. Br.-- Growths very small under cultivation, 3-4 lines high, and $1\frac{1}{2}$ - $3\frac{1}{2}$ lines in diameter, obconic, convex and circular in outline at the top (type C); orifice $\frac{1}{2}$ line long, level with the surface, not at all depressed; surface smooth, glabrous, green or greyish-green, often tinted with purple on the sides, with the orifice rather indistinctly outlined with darker green, and with about 2-3 separate, indistinct dots scattered over the top, or sometimes almost without markings. Flowers not seen.

South Africa: locality and collector unknown.

I have had this plant in cultivation for nine years and it has never flowered with me, nor does it grow larger than the dimensions given, so I expect that under natural conditions the growths would scarcely be more than $1\frac{1}{2}$ -2 lines in diameter.

7c.-- *C. Johannis Winkleri*, N. E. Br.-- Growths described as being $2\frac{1}{2}$ -5 lines high and 2- $3\frac{1}{2}$ lines in diameter, but figured as being 4-7 lines in diameter at the truncate flattish top, circular in outline (type For I); orifice level with the top, 1- $1\frac{1}{2}$ lines long; surface glabrous, glaucous-green, not dotted. Flowers unknown.-- Resemb. *Johannis Winkleri*, Dinter in Feede Report. *Zeitschr. f. Sukk.* vol. 2, p. 18, with fig. (1925).

Great Namaqualand; Klinghardt Mountains, Dinter.

I have not seen this species. It seems to be near to *C. minutiflorum*.

27a.-- *C. klovenense*, N. E. Br.-- Growths 3-4 lines high, 3 to 6 lines broad and $3\frac{1}{2}$ -4 $\frac{1}{2}$ lines thick, obconic, elliptic in outline smooth at the truncate top, which has a broad notch across it sloping upwards and outwards from the orifice to a convex outer part (intermediate between types K and L), orifice $1\frac{1}{2}$ - $1\frac{3}{4}$ line long, rather slightly closed; surface smooth, glabrous, greyish-green, with purple sides, and the top sprinkled with small separate and very distinct dark green or purplish dots, which are sometimes irregularly scattered, sometimes arranged in lines, but not forming any regular pattern. Calyx 4-lobed, ovary and part of the tube included in the body of the plant; tube about $1\frac{1}{2}$ lines long; lobes oblong, reddish or whitish. Corolla 5 lines in diameter, expanding at night; tube about 2 lines long; petals about 25-30., in two series, $2\frac{1}{2}$ lines long, $1/5$ - $1/4$ line broad, slenderly linear, white. Inner anthers exerted, yellow. Style and stigma not seen.

Van Rhynsdorp Division; Near Kloven, growing on flat rocks in

494 about an inch of soil, Tritl.

Described from a living plant sent to me some years ago by

55.-- *C. leviolum*, H. E. Br. in Gard. Chron., 1922, v. 72, p. 2, fig. 5. Add synonym *C. glebul*, Schrank in Montsch. f. Gart., August 1920, v. 12, and September 1922, v. 12.

I have not seen a specimen of *C. glebul*, but H. E. Schrank informs me that it is identical with *C. leviolum*, H. E. Br., which was published one month earlier (July 1920) as *C. leviolum*,

56.-- *C. Haveri*, H. E. Br.-- Growth of newly imported plant 4-6 lines high, $2\frac{1}{2}$ - $3\frac{1}{2}$ lines broad and $2\frac{1}{2}$ -3 lines thick, obovoid or obconically subcylindric or very slightly compressed, obtusely rounded or as if very slightly pinched between the finger and thumb at the top, not at all notched or lobed at the apex (type C); orifice $1\frac{2}{3}$ line long, terminal and not in the least depressed; surface smooth, somewhat harshly velvety-puberulous to the touch uniformly opaque green without dots or other markings, except when going to rest, when a faint red dot appears on each side of the orifice. Calyx much exserted, membranous, 4-lobed, whitish, with reddish tints to the lobes; tube $2\frac{1}{2}$ -3 lines long; lobes 1 line long, ovate or ovate-oblong, obtuse. Corolla (a dried flower only seen) probably 7-8 lines in diameter; tube about 4 lines long, yellow; petals apparently not very numerous, $1\frac{1}{2}$ -2 lines long, narrowly linear, acute, yellow; no stamens or inner petals. Stamens many, in about 4 series, all exserted, whitish. Style 4-4 $\frac{1}{2}$ lines long, as long as or exceeding the stamens, apparently yellowish; stigma 4, filiform, $\frac{1}{2}$ line long yellow or orange.

Little Newscotland; vicinity of Steinbof, -ayer, Marloth 6516.

This is a very distinct species, whose relationship is not very clear. It seems to be a connecting link between *C. Leopoldtii* and the group to which *C. bilobum* belongs, through such species as *C. hahlenbergense* and *C. gracilistylum*. Its surface, as seen under a strong lens, is covered with microscopic points, causing it to feel somewhat harshly velvety to the touch.

7b.-- *C. minutiflorum*, H. E. Br.-- Growth 6-9 lines high, 6-8 lines broad and $4\frac{1}{2}$ - $7\frac{1}{2}$ lines thick, obconic, flat or faintly convex at the top (type E); elliptic to nearly circular in outline; orifice depressed, $2\frac{1}{2}$ - $3\frac{1}{2}$ lines long; surface smooth, glabrous, uniformly glaucous-green, without dots or markings, not shining. Calyx 5-6 lobed, tube included in the body of the growth, about $2\frac{1}{2}$ lines long; lobes exserted about 1 line long, oblong, obtuse. Corolla $7\frac{1}{2}$ -8 lines in diameter expanding at night and very short raised above the surface of the plant; tube about as long as the calyx-tube, petals many, $1\frac{1}{2}$ - $1\frac{2}{3}$ line long, linear, clear yellow. Stamens according to Schrank (for I have not been able to dissect the only flower seen) about 75, the upper exserted. Anthers yellow like the petals. Style, ex Schrank, 2 lines long; and stigma 5, about $1\frac{1}{2}$ line long.-- *C. calculus* var. *minutiflorum*, Schrank in Montsch. f. Gart., June, 1920. p. 61, with fig. *C. minutiflorum*, Schrank in Montsch. f. Gart., June 1922, p. 81.

Little Newscotland; near Cokier in the Amiesberg range, Marloth 11,930.

The above description is made partly from a growth of the

484 type plant kindly sent to me by Mr. G. Schwantes, and partly from a plant sent to me by Dr. Barthol. In general appearance this species much resembles *C. subrisum*, each side of the orifice of that species are wanting or scarcely evident in *C. minutiflorum*. It is also very much like *C. Fagese*, L. E. Br., but the orifice is not rosy, and the style and stigmas longer than in that species.

12.-- *C. minutum*, L. E. Br., in Gard. Chron., 1922, vol. LVII, n. 231. Add to references, *C. minutum*, Schwantes in Monatssch., f. Kakt., September 1920, n. 131.

26a.-- *C. notatum*, L. E. Br.-- Growths 4-7 lines long and 3-5 lines (or sometimes more) in diameter, obconic, somewhat circular in outline and flat or very slightly convex at the top (type B). Orifice 1-1½ line long; surface smooth, glabrous, greyish-green, marked on the top with many irregular branching lines formed of confluent or separate blackish-green or purplish dots, and the orifice outlined with similar dots, and with the sides often exerted, 4-5-lobed; tube 2½-3½ lines long 1-to-1½ line broad, greenish; lobes 1 line long, oblong, obtuse, reddish. Corolla 5-7½ lines in diameter, expanding in the evening, slightly scented; tubed 2½-3 lines long; petals 20-24 in 1-2 series, lax, recurved-spreading, not spirally arranged, very slender, 2½-4 lines long, about 1/10 line wide, linear, white, with 2-3 distinct lines. Stamens about 30, in two series; anthers all more or less exerted, pale yellow. Style 1½ line long, pale green; stigmas 4, erect, 1-1½ line long, greenish-white, attaining to about the middle of the corolla-tube.

South Africa: locality and collector unknown.

Described from living plants that I have had in cultivation for several years. I find that it varies in size from year to year.

28.-- *C. obcordellum*, L. E. Br., in Gard. Chron., 1922, vol. LVII, n. 307. Add to reference, *C. obconollum*, Schwantes in Monatssch., f. Kakt., September 1920, p. 132.

1.-- *C. pilosulum*, L. E. Br., in Gard. Chron., 1922, vol. LVII, n. 214. This has now flowered and proves to be a species of *Gibbaeum*, which see.

11.-- *C. Pearsonii*, L. E. Br. -- Growths about 6-10 lines high, and 6-12 lines in diameter, very broadly obconic, with a flat circular top which often overhangs the sides (type H); surface smooth, glabrous, uniformly of a light bluish or sub-glaucous-green, not dotted. Calyx 3-5 lobed; tube exerted, whitish, Corolla 8-11 lines in diameter, expanding in daytime and remaining open irrespective of cloud or sunshine, scentless, lasting about a week; tube longer than the calyx, dull orange-pink; petals 17-22, in two series, 2½-3 lines long, 2-3/4 line broad, cuneately linear, obtuse or slightly notched at the apex, widely spreading, rich bright magenta, fading to white at the base, shining; staminodes petal-like (inner petals?), long, linear-filiform, very acute, yellow or orange. Stamens all included in the corolla-tube below the staminodes. Style 1-1½ line long; stigmas 4, erect, minute, about 1 line long.-- *C. Wettsteinii*, L. E. Br., in Gard. Chron., 1922, vol. LVII, n. 231. *C. Wettsteinii*, L. Bolus in Ann. S. Afr. Mus. vol. 8, n. 141. Excluding all other synonymy.

Van Rhynsdorp Div. Near Bokhuis, Pearson 5469.

L. E. Brown

(To be continued.)

but smaller in all its parts. Growth 6-7½ lines high and 4½-7½ lines in diameter. Calyx 4-lobed; tube 2-2½ lines long, exserted as well as outer part of the ovary; lobes ½ line lines in diameter; petals 20-25, about 7-4 lines long, and 2/3 - 1 1/4 line broad; staminodes 1-1½ lines long. Style about ½ line long; stigmas 4, about 1/4 line long.

In my previous account of this plant I unfortunately mistook and described it for the plant named *M. Wettsteinii* by Berger, which it so closely resembles, that, in the absence of a figure showing structural details of the flower, I certainly thought it was the same species. But having afterwards obtained a plant of the original *M. Wettsteinii*, and having now had both plants in flower together, I find that they represent two distinct species. As my previous description (with the exception of the mention of dots on the growths) was entirely made from Pearson's plant, I shall give, later, a description of the true *C. Wettsteinii*.

The variety minor I am quite unable to distinguish from typical *C. Pearsonii* by any character except size.

16.-- *C. Furrusii*, N. E. Br.-- On account of its earlier publication this is a change of name for *C. albertense*, N. E. Br., in Gard. Chron., 1922, v. 71, p. 261, which must now stand as a synonym of the above; other synonyms are *M. purpusii*, Schwantes in Monstsch. f. Kakt., March 1922, p. 73, with fig.; *M. sinuatum*, Schwantes in Journ. Linn. Soc. Bot., v. 45, p. 92 (July 1920). *M. malleoliforme*, Schwantes in Monstsch. f. Kakt., May 1922, p. 77, with fig.; *M. albertense*, N. E. Br., in Journ. Linn. Soc. Bot., v. 45, p. 92 (July 1920). Prince Albert Division: Prince Albert Herbarium, Herloth 11, 271.

All the above names, in my opinion, undoubtedly belong to one and the same species. They were all collected in the Herbarium near Prince Albert Road, by Dr. R. Herloth and others. Mr. Schwantes has obligingly sent to me portions of his type plants of *M. Furrusii* and *M. familiare* (syn. *M. minusculum*, Schwantes not of N. E. Br.), and these certainly represent only one species and are identical with *C. albertense*, N. E. Br. I have not seen *M. malleoliforme*, which Mr. Schwantes informs me has died out of cultivation, but there is no character whatever in the description or figure that distinguishes it from *C. Furrusii*. Mr. Schwantes considered it different on account of its larger size, but I have growths upon my plant of *C. Furrusii* (*C. albertense*) as large as those figured for *M. malleoliforme* and others smaller than the smallest figured for *M. Furrusii*, all on the same individual. Dr. Herloth has also informed me that he collected and sent only one species from Prince Albert Road, but that different individuals varied somewhat in markings and appearance, exactly as I find them to do in other species, as, for example, in *C. Bevillei*, *C. placitum*, *C. truncatellum*, etc.

It may be well to point out that Mr. Schwantes describes this and other species as having the surface covered with very minute papillae. This is misleading, for I find--from all the species

500 that he merely means the slightly convex surfaces of the external cells as seen when very highly magnified, and not visible to the eye and as ordinarily understood by botanist and explorers. I should describe the surface of all the plants above mentioned as being smooth.

14.-- *C. saxatile*, N. E. Br., in The Gardeners' Chronicle, 1922, v. 71, p. 261. Added to the synonymy *Peserobryanthum* Poehnerianum, Zw. in Zeitschr. f. Sukkulanten, December 1923, and October 1924, p. 131.

15b.-- *C. spirale*, N. E. Br.-- Growths $4\frac{1}{2}$ -6 $\frac{1}{2}$ lines broad and 3-5 lines thick, obconic, slightly and very obtusely ridged across the breadth of the somewhat convex top (type E.), orifice 2-2 $\frac{1}{2}$ lines long, depressed, tightly closed, with a dimple at each end, and usually it is not outlined with dots or a dark margin as in most species: surface smooth, glabrous, of a greenish-green or sub-glaucous-green, rather thickly sprinkled with minute small dots of a darker green, scarcely arranged in any pattern, but usually the larger of flowering growths have a line of separate dots arranged in the form of two arches on each side of the orifice and another line of them along the ridge. Ovary included in the orifice. Calyx 6-7-lobed, reddish; tube 2 lines long; lobes 1 line long, obtuse. Corolla 3-3 lines long in diameter, expanding at night, scentless; tube $2\frac{1}{2}$ -4 lines long; petals 20-25, in 1-2 series, 2-5 lines long, linear-filiform, especially arranged, whitish. Stamens many, in about 3 series, nearly all exserted and the longer considerably so; anthers whitish. Style very short, about $1\frac{1}{4}$ line; stigma 6, about 1 line long, filiform, pallid.

Prince Albert Division: Near Prince Albert Road, Fillans

Described from a living plant sent to me by Mr. H. S. Fillans. The spiral arrangement of the petals in the fully expanded flower, as well as the markings on the growths, clearly distinguishes this from allied species.

N. E. Brown

(To be continued.)

PESEBRYANTHUM

Gard. Chron. III. 79: 12. 1923.

(Continued from vol. LXXVIII, p. 500).

37a.-- *C. tentillum*, N. E. Br.-- Growths as first developed after importation, 2-4 lines high, $2\frac{1}{2}$ -4 lines broad and 2-3 lines thick, some of them smaller, obconic, faintly or distinctly notched (somewhat as in type K), and faintly ridged at the top, with the orifice $\frac{1}{2}$ - $\frac{3}{4}$ line long, having garing lips; surface smooth, glabrous, green, not at all glaucous; the orifice area is broadly elliptic or obicular and pallid, surrounded by dark green or at the sides (where the marking is slender) purplish; at each end of the orifice the dark marking enlarges into a large, irregularly triangular patch on the ridge on each side of the orifice is a purplish or dark green dot or short line, and thinly scattered over the top are also from 2 to 9 other small dots. Calyx much exserted, 4-lobed, membranous, whitish, with the lobed tipped with reddish or greenish hue; tube 2 lines long;

12 lobes $\frac{3}{4}$ line long, ovate, obtuse. Corolla (a dried flower only seen) probably 5-6 lines in diameter; tube exceeding the calyx, about $3\frac{1}{2}$ lines long; petals magenta-purple; no stamodes or inner petals at the mouth of the tube. Stamens numerous, in 4 series at the throat of the corolla-tube, the two upper series exerted, yellow. Style $3\frac{1}{2}$ lines long, slender, attaining to the mouth of the corolla tube; stigmas 4, about $\frac{1}{2}$ line long, yellowish. Capsule 1 line in diameter, quadrangular, with 4 valves and cells, thin, pale brown; each valve with one central, honey-coloured, expanding keel with broad, membranous, spreading, marginal wings. Seeds minute, $\frac{1}{4}$ line in diameter, compressed, somewhat pear-shaped in outline, smooth, pale brown.

Little Namaqualand: Vicinity of Steinkopf, Meyer, Harloth 6512.

This appears to be allied to *C. minusculum*, N. E. Br., although quite distinct from that charming species.

26a.-- *C. Taylorianum*, N. E. Br.-- Growth 4-7 $\frac{1}{2}$ lines high, 5-7 lines thick and $3\frac{1}{2}$ -5 lines broad, circular or elliptic in outline at the flattened or transversely depressed top; orifice flattened $\frac{3}{4}$ -1 $\frac{1}{4}$ line long; surface usually purplish-green on the sides and dull greyish-green on the top, marked with blackish-green dots. Flowers unknown.--Resemb. *Taylorianum*, Dinter in Fedde Repert., Beiheft (Succulentenforschung in Südwest-Afrika) v. 23, p. 58 (1923); and Dinter and Schwantes in Zeitschr. f. Sukk. v. 2, p. 27 (1925).

Great Namaqualand: Hlincherat Mountains, Dinter 3872.

This species is unknown to me.

15.-- *C. viridicatum*, N. E. Br. var. *punctatum*, N. E. Br.-- Growth as in the type, often but of a somewhat greyish-green, with the sides often purplish-tinted and the top thickly sprinkled with very small dots of a darker green, not confluent nor arranged in lines except sometimes along the obscure keel, and the orifice somewhat indistinctly outlined with similar dots.

Isingsburg Division: near Grootfontein Leers.

I have had this variety under cultivation for many years but have not seen its flowers, and find that it is fairly constant in the character of its dotting, by which alone it can be distinguished from the type, and as the typical form often has some of its growth more or less dotted, I have no doubt that it is a mere variety of that species.

In Gard. Chron., vol. LXXI, n. 361, I have wrongly placed this species, for it should have been placed after *C. pinnatum*, on n. 214, as the surface is covered with a very microscopic puberulence, and is faintly velvety to the touch.

11a.-- *C. Whettsteinii*, N. E. Br.-- Growth 6-9 lines high, 10-15 lines broad and 10-12 lines thick, broadly obconic, circular or elliptic in outline at the truncate flattish top, which often overhangs the sides (type H); orifice 2-2 $\frac{1}{2}$ lines long; surface smooth, glabrous, glaucous-green, faintly and rather minutely dotted with darker, and the orifice outlined with darker green. Calyx usually and sometimes the ovary exerted, 4-6-lobed; tube 5-7 $\frac{1}{2}$ lines long, 1 $\frac{1}{2}$ line broad, greenish; lobes 1-1 $\frac{1}{2}$ lines long, oblong, obtuse, reddish or green. Corolla 10-15 lines in diameter, expanding in daytime irrespective of sunshine or dull weather if the temperature is warm enough, and lasting about a week; scentless; tube 4-5 $\frac{1}{2}$ lines long, about as long as or longer than the calyx,

12 whitish; petals numerous, in 2-7 series, widely spreading and closely overlapping one another, 4-7½ lines long and 3/4-1 1/4 line broad, notched at the obtuse tips, bright rosy-magenta; staminodes none. Stamens numerous, in 4-5 series, the upper exserted from and the others included in the corolla-tube; filaments and anthers bright yellow. Style about 4-7 lines long, included in the corolla tube or exserted 1-1½ line beyond the stamens, divided at the top into 4 stamens about 3/4-1 line long, very pale yellowish.

C. Wettsteinii, Berger, Mesemb. p.p. 285, 288, fig. II. (1909) Schlechter in Engl. Jahrb. v. 45, p. 229; *C. truncatellum*, Thunberg in Gartenwelt, v. 11, p. 301, with fig. (1907), not of Neworth.

A native of Little Namaqualand, precise locality unknown, Miss Phillimore.

Described partly from a portion of the original plant described by Berger, the locality of which is unknown, and partly from a plant of the same species sent to me from Little Namaqualand. My two plants are identical in every particular, except that one has long exserted style, 7 line long, while the other has the style included in the corolla-tube and about 5 line long, being, in fact, long and short-styled forms of the same species. But whether the length of the style varies in different year on the same plant, as I have noticed it to do in *C. bilobum*, I am unable to say.

C. Wettsteinii differs from *C. Pearsonii* by the surface of the growths being faintly dotted on the top; by the absence of staminodes at the mouth of the corolla, and by the very much longer style.

2la.-- *C. Wiggettii*, N. E. Br.-- Growths of imported plant 3-5 lines high and 2½-6½ lines in diameter, obconic, elliptic to circular in outline, and when received in their shrivelled, resting condition were quite flat on the top, becoming convex when in growth (intermediate between types D and E), with a central orifice about 1 line long that is not at all depressed, smooth, glabrous, dull green (perhaps grey-green in nature), quickly marked with blackish or very dark green, separate (not at all confluent) large, round dots (which vary from 1/40½ line in diameter) the sides are more or less tinted with dull purple. Only dead flowers seen which demonstrate that the plant is a *Conophytum*, but are unfit for description.

Oudtshoorn Division: at Hazenjaacht, Mr. I. Wiggett 4.

This is very distinct from all other species that I have seen, being easily recognised by its unusually large, separate dots, which are not disposed in any pattern, but are equally scattered over the top, and by the orifice not being at all depressed. I have much pleasure in naming it after its discoverer.

Key to the Species that are more or less two-lobed and usually compressed at the top of the growths.

- 1.-- Surface-cells as seen with a lens projecting as microscopis points, scarcely hairs, and faintly harsh (scarcely velvety) to the touch, distinctly or indistinctly dotted. (See also *C. Meyeri*, which really belongs to this group but it is not two-lobed at

Surface-cells as seen with a lens flat or convex, not projecting as microscopic points, smooth, or in *C. exsertum* slightly harsh to the touch.

4

- 2.--Growths 1-2 inches high and $3/4$ -1 inch broad, with the notch 3-6 lines deep; lobes equal, flat on the inner face; dots very conspicuous. *apiatum*

Growths 3-18 lines high and 3-10 lines broad, with the notch $1/2$ -5 lines deep; lobes equal or unequal; dots usually evident but not very conspicuous. 3

- 3.--Growths 9-18 lines high and 5-10 lines broad; lobes rounded on the inner face; glaucous-green or whitish-green.

albescens

Growths 3-12 lines high and 3-8 lines broad, usually taller than broad; lobes very short or flattened on the inner face; green or somewhat glaucous-green.

hahlenbergense

Growths 4-7 lines high, and $4\frac{1}{2}$ - $6\frac{1}{2}$ lines broad, usually about as broad as tall, with the notch $1/2$ -1 lines deep and its faces flat. *quiescens*

- 4.--Growths uniformly glaucous-green without dots or other markings. 5

Growths either with more or less evident dots or markings, or not glaucous-green. 6

- 5.--Growths 1-2 inches high and much taller than broad, with the notch 4-9 lines deep; flowers yellow. *bilobum*

Growths $1/2$ -1 inch high and nearly or quite as broad, with the notch $1\frac{1}{2}$ - $2\frac{1}{2}$ lines deep; flowers rosy. *nuciforme*

- 6.--Flowers white; growths 5-16 lines high and 3-7 lines broad, with the lobes mostly unequal, $3/4$ -3 lines long, convex on the inner face; light green or yellowish-green with or without a few indistinct darker-green dots on the lobes. *Roodiae*

Flowers red 7

Flowers yellow 8

- 7.--Growths 5-8 lines high; lobes sub-cylindric, marked with dark green lines on the top, and dotted on the lower part. *turrigerum*

Growths 7-15 lines high and 5-8 lines broad, with the notch $1/2$ - $3\frac{1}{2}$ lines deep or sometimes absent; lobes not cylindric; dots distinct, no lines or only a red one on the top of each lobe. *gracilistylum*

8.--Growths 7-14 lines high and 6-10 lines broad, as broad as high or much taller than broad, of a somewhat dull bluish-green; dots usually not particularly

Growths 12-21 lines high and 6-10 lines broad, always much taller than broad.

9

9.--Growths pale glaucous-green or whitish-green, slightly harsh to the touch, but without microscopic points or hairs; ovary exserted and the expanded flower rising much above the top of the lobes; stigmas red.

exsertum

Growths of a somewhat bluish-green; smooth to the touch; ovary not exserted and the expanded flower either below the level of the top of the lobes or not rising much above them.

10

10.--Lobes $1\frac{1}{2}$ -4 lines long, somewhat obtuse at the apex; stigmas red.

cauliferum

Lobes 5-6 lines long, obliquely acute at the apex; stigmas yellowish.

sororium

The plants of this group seem to be chiefly natives of Namaqualand, where there seem to be several closely-allied species. I have a few others, but they are not at present in a fit state for description.

51b--*C. albenscens*, N.E.Br.-- Stemless. Growths 9-18 lines high, 5-10 lines broad, and 4-8 lines thick, cylindric-oblong, compressed and 2-lobed at the top, with a notch 1-5 lines deep, and the lobes usually equal, but on short-lobed plants often unequal, rounded on the inner (or notch) face; surface covered with a pubescence of microscopic points, scarcely hairs, and somewhat harsh to the touch, whitish-green or pale glaucous-green, somewhat indistinctly dotted with darker green and with a short red line on the tips of the lobes. Ovary more or less exserted. Calyx 5- (or perhaps

13 sometimes 4-) lobed; tube $2\frac{1}{2}$ lines long; lobes $1\frac{1}{2}$ line long, oblong, obtuse, green or reddish. Corolla about 1 line in diameter, expanding in daytime; tube 4-4 $\frac{1}{2}$ lines long, slightly longer than the calyx, somewhat funnel-shaped above, yellow; petals about 4 lines long, $1\frac{1}{3}$ - $\frac{1}{2}$ lines broad, linear, subacute or obtuse, bright clear yellow, shining. Stamens numerous, in about 4 series, most of them well exserted from the corolla-tube, yellow; filaments 2-3 lines long. Style 3 lines long, greenish, stigmas 6, about $2\frac{1}{2}$ lines long, pale reddish. Top of the ovary, conical, green.

Little Namaqualand: locality unknown, but possibly from near Chubiessis, as it was sent by Professor Pearson along with *C. cauliferum*.

This very distinct species is known by cultivators of these plants as "Heath's seedling," and Dr. Rodier Heath informed me that he raised it from seeds taken from a capsule that was upon one of the plants sent to Kew by Professor Pearson along with *C. cauliferum*. The plant died, and the seedlings raised from it by Dr. Heath now exist in several collections. I have cultivated

13 it for many years without succeeding in flowering it, and am indebted to Mr. W. M. Endean, of Laindon, Essex, for the loan of a plant in flower, from which the above description has been made. W. E. Brown

(To be continued.)

HERBARIUM MUSEUM.

Gard. Chron. III. 79: 50. 1926.

(Continued from page 13.)

- 30 51c.--*C. exsertum*, W. E. Br.--Stemless. Growths 1-13/4 inch thick, 6-9 lines broad, and 5-6 lines thick, somewhat cuneately cylindric below, compressed, and two-lobed at the top (type S); lobes 2-4 lines long, slightly diverging, flat on the inner face, rounded on the back, obscurely keeled on the top, obtusely rounded at the top in side view; surface smooth and slightly harsh to the touch, glabrous, pale glaucous-green or whitish green, with a small patch of darker green at the base of the notch between the lobes, and with the keel on the top of the lobes red. Flower rising far above the top of the lobes of the plant. Ovary entirely exserted. Calyx 4-5-lobed, whitish or with reddish tints to the lobes; tube 2-2 1/2 lines long; lobes 1-1 1/2 line long, oblong, obtuse. Corolla about an inch in diameter, expanding in the afternoon, scented; tube 6-7 lines long, much longer than the calyx, funnel-shaped, yellow; petals 5-6 lines long, 1/2 line broad, linear, acute or obtuse, recurved-spreading, entirely clear yellow, shining. Stamens numerous, in 4-5 series, all arising below the middle and the lower at the bottom of the tube, with the upper exserted; filaments orange; anthers yellow. Style 5 lines long; stigmas about 2 1/2 lines long, filiform, slightly spreading, entirely exceeding the anthers, deep orange-red. Top of the ovary conical, green.

Little Namaqualand: Locality unknown, sent to Kew with other species by Professor Pearson in 1911.

This species might easily be mistaken for *C. albescens* when seen separately, but may be recognised by the lobes of the plant being flat (not convex) on the inner or notch side, by the surface of the plant being destitute of the microscopic points that cover *C. albescens*, and by the flowers also being different, the stamens being only just exserted and much overtopped by the stigmas, which are close of a darker red.

50a.--*C. hahlenbergense*, W. E. Br.--Growths described and figured as being 4-12 lines high and 3 1/2-8 lines broad, but in the plants seen 5-7 lines high, 5-4 lines broad & 2-3 lines thick, compressed, cuneately obovoid, shortly 2-lobed at the top (type R); lobes erect, less than 1 line long and rounded on the inner face in the plants seen, but figured as being 2-3 lines long, slightly keeled along the top, which is rounded in side view; surface smooth, microscopically ruberulous, slightly velvety to the touch, green or somewhat glaucous-green, distinctly dotted with darker green, often tinted with purple at the apex under full exposure to the sun. Flowers small, figured as being about 3 lines in diameter, yellow. Capsule when closed 1 1/4 line in diameter, when expanded 3 1/2 lines in diameter, 4-lobed, seeds few.--Hoeberl. *hahlenbergense*, Dinter in *Feldes Report., Zeitschrift Succulentenforschung in Südwest-Afrika*, v. 8, p. 32 (1925); and Dinter and Schumacher in *Zeitschr. f. Sukk.* v. 2, p. 17 (1928).

30 exerted from the mouth of the corolla-tube, pale yellowish. Style 3-4 lines long; stigmas 5, filiform, 2½ lines long and exerted above the anthers for all their length, slightly spreading pale yellowish.

Little Namaqualand: probably from between Stinkfontein and Chubbessis, as it was sent by Professor Pearson along with *C. bilobum*. N. E. Brown

(To be continued.)

WESTBRYANTHEMUM.

Gard. Chron. III. 79: 49. 1928.

(Continued from page 30).

CORPHYTUM.

48 2. *Corphytum*, N.E.Br. Perennial, less than an inch high, tufted, succulent. Growths of small, ovoid (or under cultivation elongated-ovoid), soft and pulpy bodies, with a small fissure at the apex, having its lips closed or gaping. Flower solitary, partly or just exerted from the notch. Calyx produced above its union with the ovary into a short green (non-membranous) tube, 6-7 lobed above. Corolla of numerous petals in 2-3 series, probably free, but in the withered flowers seen apparently united at the base into a very short tube, which may have been due to partial deliquescence and adhesion of the parts? Stamens many, erect. Style non; stigmas 6 or perhaps sometimes 5, filiform. Ovary half or more than half-superior, depressed and with 6 ridges on the top, 6-celled; placentas on the floor of the cells. Capsule with 6 valves and cells; each valve with 15 expanding-keels closely contiguous so as to form one stout, central keel distinct from the cell-partitions, and having broad, spreading membranous marginal wings, that are sometimes united in pairs between the valves; cells open, without cell-wings. Seeds several in each cell, small, compressed-ovoid, with a nipple at the narrow end.

Species 1, native of Van Rhynsdorp Division, South Africa.

The name is derived from the Greek, *oon*, an egg, and *phyton*, a plant, in allusion to the small egg-shaped growths of the plant as it grows under natural conditions.

I am unable to give a diagram of the floral structure of this genus, as the idea of making such diagrams did not occur to me on the only occasion I have had the opportunity of doing so.

C. oviforme, N.E.Br. Growths, as developed in South Africa, 4-6 lines high and 2-5 lines thick, becoming, under my cultivation, 6-9 lines high and 7-8 lines thick, ovoid, obovoid or cylindrical-ovoid, obtuse or very convex at the top, with an apical fissure-like orifice 1-2½ lines long; rather soft in substance; surface glabrous rather thickly covered with minute pimples or raised dots as seen under a lens, green (not glaucous-green), with the dots or pimples darker and slightly shining; sheaths soft, pale brown. Flower just exerted from or the calyx included within the orifice. Calyx globose, 6-7-lobed, green; tube 1½-2 lines long, including the part adnate to the ovary; lobes 1-5 lines long and ¾-1 line broad, oblong, obtuse. Corolla 6-9 lines in diameter; petals numerous, in 2-3 series, 3-5 lines long, 1/8-½ lines broad, linear, obtuse, stated to be rosy or pale magenta, but in the withered flowers seen are apparently whitish.

48 Stems numerous, 1-1 1/4 line long, filiform. Ovary half or more than half-superior, depressed and with six ridges on the top, 7-celled. Consule 2-3 lines in diameter, somewhat depressed-sub-globose, with 6 coning double and somewhat wing-like ridges on the top, and with 6 valves and cells, when expanded about 4 1/2-6 lines in diameter; valves reflexed when expanded, pallid, each with an orange-coloured central extending-beel as long as the valve and pallid broad elliptic or subrectangular membranous marginal-wings; cells open, without or with only rudimentary cell-wings. Seeds 15-20 in a cell, 1/4 line long, ovoid, with a nicle at the narrow end, smooth, light brown.---*Mesembryanthemum oviforme*, N.E.Br. in Journ. Linn. Soc. v. 47, p. 95 (July 1920). *Conorhynchum oviforme*, N.E.Br. in The Gardeners' Chronicle, 1921, v. 111, p. 207. Pic. 84, 1-L, and v. LXXI, p. 251, fig. 123.

Van Rhynsdorp Division: In the Herdeveld, Harloth; region of Van Rhynsdorp, Mrs. E. Rood.

An examination of more complete material than I had when I first described this plant demonstrates that the structure of the flower and fruit is quite different from that of *Conorhynchum*, as is also its mode of growth in the seedling and adult stages.

49 In its seedling stage the cotyledonary body is smooth, but the first growth instead of merely replacing the cotyledonary body as in *Conorhynchum* is protruded much above it and is minutely papulose

especially at the smooth basal part, and contains air-cells inside, which clicken slightly when viewed with a lens. In the adult plant the growths develop out of one another so as to appear somewhat superposed until the old growth withers to a mere skin. This is a very different mode of growth from that of *Conorhynchum*, in which the successive growths merely replace each other, and so far as I have seen no species of *Conorhynchum* is at all papulose.

I have not seen a perfectly fresh flower, only two like withered flowers that may have developed during their journey from South Africa, so that I am uncertain whether the petals are really free or whether in the process of withering they had clung together at the base so as to form a very short tube.

N.B.-- The plant described as *Mesembryanthemum nana* by Schlechter, from the description and from the dried specimens I have seen of it, would appear to have somewhat the same general appearance as *O. oviforme*, but the single flower seen seems to be quite different, being very much smaller and on a slender exerted pedicel. However, the specimens are so badly pressed that it is quite impossible to determine the true structure and appearance of the plant, which I suspect belongs to some other genus.

H. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 79: 80. 1926.

(Continued from page 49.)

3.--LITHOPS, H. E. Br.

22 This genus comprises stemless perennials consisting of one, two or several growths in a clump, in nature mostly buried in

30 the ground, so that their tops are nearly, or quite, level with the surface. Each plant or growth consisting of an obconic or slightly compressed subcylindric fleshy body, which, when adult, has a transverse fissure all across the top, dividing it into two short contiguous (or under cultivation sometimes gaping) lobes, truncate and flat or slightly convex at the top; in the juvenile stages it often has only a small central orifice exactly as in *Conorhynchum*. Flower usually solitary, rarely 2-3 from the same growth, just exerted from the centre of the fissure. Calyx not membranous, partly or entirely exerted from the fissure, compressed not produced into a tube above its union with the ovary, 4-7 usually 5-6)-lobes. Petals many, free to the base. Stamens numerous, collected into an erect column or cone. Style short or almost absent; stigmas 4-7, filiform. Ovary inferior, 4-7-celled; placentas on the outer wall or floor of the cells. Capsule small, with 4-7 valves and cells; each valve with one stout central expanding-keel, or the expanding-keels contiguous for most of their length with the tips diverging, and with a broad membranous wing on each margin; cells open, without cell-wings or a tubercle. Seeds minute, sub-globose or slightly compressed-ovoid, with a short nippel at one end.--M.E.Br. in *The Gardener's Chronicle*, 1922, v. LVII, p. 44.

Species 19 at present known, native of Beggarsland, Great and Little Namaqualand, S.W. Africa, and the Orange River, S.W. Africa.

The type of the genus is *L. Lesliei*, M.E.Br.

The name is derived from the Greek, lithos, a stone, and ops, face or appearance, in allusion to the resemblance of these plants to the stones among which they grow.

Fig. 40 is a diagram showing the floral structure of this genus.

Fig. 40.-- *Lithors turbiniformis*.

(Diagrammatic section of flower).

The references to and descriptions of species that follow are additional to those already given in *The Gardeners' Chronicle*, 1922, vol. LVII, pp. 55, 55 and 80, and bring the account of this genus up-to-date.

The members of this genus are great favourites with those who cultivate succulent plants, not only account of their neat appressed showy flowers and interesting character, but also on account of the remarkable way in which they imitate the stones and soil among which they grow. It appears to me, however, that it is not certain that we have arrived at a correct solution when we state that this mimicry of their surroundings is a real protection to the plant. It may be that it is; at the same time, it has recently occurred to me that as the eyesight of animals and birds is so much keener than that of mankind, as the botanical collector is able to find these plants when he searches for them, why may not the hungry animal or bird with their much keener eyesight be able to do so too? They would surely sometimes find one or two, and the experience thus gained would teach them how to look for others. At least, that is how it appears to me. And, indeed, Berger, in his work on *Mesembryanthemum*, p. 11, records that Dinter has mentioned

that baboons search for and eat *Lithos pseudo-truncatella*, so that they, at any rate, have learned how to detect it, in spite of the fact that it is a species that so closely resembles the stones it grows among as to be easily overlooked. Yet one cannot overlook the fact that the ordinary non-botanical person as I have recorded in *The Gardeners' Chronicle*, vol. LXX, p. 250, and vol. LXXI, p. 44.

Even when in flower, some of these mimetic species, I am informed by more than one South African observer, are practically indistinguishable from their surroundings at a short distance, and when out of flower and at rest, they are so inconspicuous that one correspondent, writing of mimetic species belong to other genera than *Lithos*, writes of them, when in a resting condition: "I cannot find them, I can't think where they all get to." So that if animals and birds, in spite of their having keener eyesight and instincts than man, are, after all, only comparable with the ordinary non-botanical observer and not with the botanical collector, then there can be no doubt that mimicry would protect the plants. But can we assume that in the cases passed animals and birds, driven by hunger, have not learned how to use their keen eyes and distinguish these mimetic plants from their surroundings, even as the keen-eyed botanist has done? At present, it seems to me, that this subject of mimicry has not been so clearly solved as some are prone to believe.

And there is another problem connected with this genus *Lithos* (and other genera that belong to the little group called "Windowed Plants"), which in nature are said to grow buried in the ground with only the top or windowed part of the leaves above the soil, of which the accepted solution is not quite a sufficient and satisfactory explanation, I think. I have given particulars and an illustration of the structure and mode of growth of this genus in *The Gardeners' Chronicle*, 1891, vol. LXX, p. 250, p. 118, and additional details of the same subject will be found given by Miss M. Kerster in the Dutch publication, *Succulente*, 1893, vol. VII, p. 127. The above-quoted figure (Fig. 41) is reproduced here, and shows how the chlorophyll-layer (Fig. 41C) is confined to the sides and wing part of the fissure of the plant, most of it being underground, the top (Fig. 41D) being the

Fig. 41.-- *Lithos* (*Mesembrythemum*)
Lesliei

The accepted explanation of the purpose of this arrangement is already detailed at the place quoted, is to prevent the chlorophyll from being injured by the intensity of the light in its native region. But continued observations of the behaviour of this and other genera of "Windowed Plants" having the same general structure, has caused me to alter my opinion. For, as grown by myself, these plants do not like being buried in the soil; if planted so, the first new growth that they make always rises considerably above it, and a plant of a species allied to *L. rhopalophylla* (which will later be found described under the genus *Leostachys*) that I planted buried in soil, as illustrated in Dr. A. Harott's splendid book *The Flora of South Africa*, vol. I, p. 307, t. 38,

80 would not grow so, but soon after the internode and raise its new crop of leaves entirely above the soil. One plant however, that was watered from above, instead of from below, quickly rotted, and I have had two plants of *L. Lesliei* also rot that were planted with their tops level with the ground. This has caused me to believe that it is not the intensity of the light that injures the chlorophyll and causes the plant to bury itself, but the necessity of preventing the loss of water stored up in the leaves during the long periods of drought and great heat these plants have to endure. For, in the first place, we have the fact that there are many species of *Mesembryanthemum*, the species of *Flottiphyllum*, some of *Gibbbaea* and *Conorhytum*, etc., that have green leaves or growths that are not at all glaucous and are fully exposed to the intense light and unharmed by it, while in *Lithops* itself the lower along the fissure is fully exposed, and in the tropics, the leaves of trees, etc. are also fully exposed to the light uninjured. In the second place, although being buried in the ground in their dry native country would protect them from too much transpiration, and to a certain extent the surrounding soil might even absorb and retain some of the moisture evaporated by the plant, which may possibly be re-absorbed by it again during the cool of the night, yet in the humid atmosphere of this country, except during the hottest summer weather, these plants evidently find it difficult to transpire sufficiently when buried in the soil, and hasten to get out of such stifling quarters. And in several instances I have found that in other stemless genera whose leaves are in contact with the soil, if watered (but not over-watered) from above when the atmosphere is rather humid, those leaves will occasionally rot where in contact with the damp earth. From these factors I have, therefore, come to the conclusion that it is for the conservation of water, and not to escape from the light, that these plants bury themselves in the ground and use the top of their leaves as a window.

Lithops Tberlanzii, N. E. Br.-- Growth 2/3-1 1/2 inch high, 6-16 lines broad, obconic, more or less circular or lunate in outline, and flattish or very slightly convex at the top, with a transverse fissure 2 1/2-5 lines deep, of a pearl-grey-ochreous or pearl-grey, violaceous colour, marked with branched lines. Flowers unknown. Capsule about 4 1/2 lines in diameter, 5-cell.

Mesembryanthemum Tberlanzii, Dinter in Fedde Repert., Beihefte, vol. VIII, p. 43 (1923), and Dinter and Schwantes in Zeitschr. f. Sukk., vol. II, n. 25 (March, 1925).

Great Namaqualand: On Kuckus-Tokenbank Flats, Dinter, and on Novis Mountains, Tberlanz.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 79: 102. 1926.

(Continued from page 80).

LITHOPS.

112 *L. Francisci*, N.E.Br.-- Growth 9-13 lines high, 6-14 lines broad, and 4-9 lines thick, obconic, flat and elliptic in outline at the top, with a transverse fissure 5-7 lines deep; surface smooth, glabrous, pale-greyish-white or dirty ivory-white, covered

102 with dentric green or grey-green markings and numerous darker or blackish dots, and sometimes flushed with reddish-yellow. Flowers not seen, described as being small, 5-8 lines in diameter; petals about 30, linear-lanceolate, yellow. Anthers numerous, yellow. Capsule 5-celled.

Mesembryanthemum Francisci, Dinter in Fedde Repert. Beihfte, vol. XIII, p. 62 (1923), and in Zeitschr. f. Sukk., vol. I, p. 10 (December 1923), and vol. III, p. 10, with fig. (January, 1925).
Great Namaqualand: Mt. Kahlenberg, Dinter 3743 and Kavis Mountains, Eberlanz and Stoeber.

L. Friedrichiae, H.E.Br., in The Gardeners' Chronicle, 1922, vol. LXII, p. 55. To this add the references:-- Karsten in Onze Tuinen, July, 1924, pp. 42-43, with fig. *Mesembryanthemum Friedrichiae*, Schwantes in Monatssch. f. Kakt., September, 1920, p. 152.

L. fulvipes, H.E.Br., in The Gardeners' Chronicle, 1922, vol. LXII, p. 55. To this add reference:-- Karsten in Onze Tuinen, July, 1924, pp. 42-43, with fig.

Lithos Julii, H. E. Br.-- Growths 9-14 lines high and 7-10 lines broad, obconic, elliptic in outline, with a transverse fissure 2-3 lines deep across the flat, wrinkled top, of a pale opaque greenish-orangeline colour, marked with slightly greyish-orangeline colour, marked with slightly depressed branching wrinkles that are somewhat subcylindrical, and at the margins of the fissure semi-cylindrical, and at the margins of the fissure with ochraceous-brown lines or dots. Corolla 12-14 lines in diameter; petals numerous, 1 line broad, lanceolate (they are probably cuneately linear), obtuse, white.

Mesembryanthemum Julii, Dinter in Zeitschr. f. Sukk., vol. I, p. 145 (June, 1924), and Dinter and Schwantes in Zeitschr. f. Sukk., vol. II, p. 26, with fig. (March 1925).

Great Namaqualand: Between Vahldoorn and Warmbad, and also near Warmbad, Dinter.

L. karasmontana, H. E. Br.-- This name must take precedence of that of *L. damarana* as being the earlier, the synonymy being:-- *Mesemb. karasmontanum*, Dinter and Schwantes in Monatssch. f. Kakt., March, 1920, p. 36, with fig. *L. damarana*, H.E.Br., Journ. Linn. Soc. vol. III, p. 67 (July, 1920). *Lithos* H.E.Br. in The Gardeners' Chronicle, 1922, vol. LXII, p. 30; Karsten in Onze Tuinen, August, 1924, page 73, with fig.

This species occasionally produces 2 or 3 flowers from the same growth, which I have never observed to be the case with any other species of this genus.

L. Lericheana, Dinter and Schwantes in Zeitschr. f. Sukk., vol. II, p. 25. Growths 2/3-1 1/2 inch high and 7-14 lines broad, obconic, more or less circular in outline at the top, with a transverse fissure 1 1/2-2 1/2 lines deep, and the top of the lobe flat or very slightly convex, of a reddish-bluish ochraceous colour, with broad branched reticulate wrinkles. Petals white. Capsule 5-celled.

Mesembryanthemum Lericheanum, Dinter and Schwantes in Zeitschr. f. Sukk., vol. II, p. 25 (March 1925).

Great Namaqualand: Near Garub, Great Nama Mountains, Dinter.

L. Lesliei, H. B. Br., in The Gardeners' Chronicle, 1922, vol. LXVI, n. 65. To this add the following references:-- Mesembryanthemum Lesliei, Schwantes in Monatssch. f. Kakt., September, 1920, n. 120, and M. ferrugineum, Schwantes in Monatssch. f. Kakt., June, 1922, n. 95.

The plant which Mr. Schwantes has named M. ferrugineum is merely a variety of the plant with the markings on the top, dense, and of a rust colour. For this plant, as do some other species of this genus, varies very much in colour, and in its markings on the top. The form named M. ferrugineum by Schwantes was found by Dr. R. Harloth in Griqualand West. I have the plant, and the same form also from the Transvaal and Bechuanaland; it is densely covered with rust-coloured markings. Even in the same vicinity the colour and the density of the markings vary greatly, and under cultivation they vary somewhat from year to year. Their flowers also vary in size. This year two of my plants that are similar in colour and markings, differed greatly in the size of their flowers; one had a flower 20-22 lines in diameter, with petals 8-9 lines long and stemens 5 lines long; the other had a flower 30 lines in diameter, with petals 13 lines long and stemens 6 lines long.

L. Harlothii, H. B. Br. (Fig. 52).-- Growth when first developed after importation 6 lines high; 4-5 lines broad and a transverse fissure 1 line deep across the truncate top; lobes equal or unequal sub-contiguous, flattish or very slightly convex on the top, rugose, from its surface being covered with small, raised, irregular, branching lines, mostly directed inwards from the margins, and of a light creamy-ochreous opaque colour; with age, the green pimples appear to become dull and brownish. Flowers not seen, probably small. Capsule when closed about 1½ line in diameter, with a short conical point on the top, very pale brownish, 5- or occasionally 4-celled; valves spreading, very acute, with the expanding-keels closely contiguous throughout into an acute pallid central keel, with broad rounded membranous marginal wings that are more or less united in pairs between the valves. Seeds minute, about 1/4 line long, ovoid, smooth, whitish.

Little Namaqualand: Near Ookiep, Harloth 6903.

This very distinct species is small, but very charming, a real gem. I have been very much interested in it since I discovered, Dr. R. Harloth, who kindly sent it to me.

H.E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 79: 116. 1926.

(Continued from page 102).

LITHOPS.

116 Dr. Harloth informs me that L. Harlothii "is a marvel of mimicry; it grows in shallow depressions of granite filled with detritus of the reddish rock and looks exactly like its surroundings. I have put my hand on some of them without knowing they were there until I investigated the spot more closely. There was

116 no other plant visible".

As the place where it grows has been visited by many collectors and the plant has not been previously discovered, it is evidently well concealed by its imitation of the soil in which it grows. This imitation of the soil is very great, for Dr. Karloth has sent me a small sample of it, which consists of grit only, most of the particles being of about the size of the letter "o" used in printing this, mingled with larger pieces up to the size of small peas, and coloured white, creamy, yellowish, reddish, coloured and brown. These colours and the granular structure correspond very closely with the colours of the irregular and pitted surface of the plant after the growing period is over, but when making fresh growth, the glittering, bright green pinpoints and elevated creamy markings might cause it to be more conspicuous. This gritty soil can hold but very little moisture, and being contained in but shallow depressions of solid rock there can be no vapour arising from the subsoil. Therefore, as the annual rainfall is very small and long droughts occur, it would seem probable that the plant exists on moisture condensed by the rock when it cools down at night.

Under cultivation I expect this plant will attain to much larger dimensions than those above given, and will probably be found to be liable to die off if given too much water.

L. marmorata, H. E. Br., in the *Gardeners' Chronicle*, 1922, vol. LXXII, p. 80. To this add reference:-- *Parsten in Onze Maan*, August, 1924, p. 70, with fig.

L. pseudotruncatella, H. E. Br., in *The Gardeners' Chronicle*, 1922, vol. LXXII, p. 85, f. 25. Add reference:-- *Pesembryanthemum pseudo-truncatellum*, Schwanter in *Monatssch. f. Lekt.*, August, 1920, p. 117, with figs.

L. rubra, H. E. Br.-- Soil to resemble *L. ortica*, but differs from that species by its dense purplish colour, which it retains throughout the winter, and its seeds being of a dark brownish red.

Pesembryanthemum ortica, H. E. Br., in *The Gardeners' Chronicle*, June 1925).

South-west Africa: Locality and collector unknown.

The above is all the description given of this plant. I have not seen it, but from the details mentioned, I have no doubt that it is quite distinct from *L. ortica*, H. E. Br.

L. Ruschii, H. E. Br.-- Growth 7/4-1 1/2 inch long and 7-1 1/2 lines broad, obconic, with a transverse fissure 3-10 lines deep across the top; lobes convex on the top and somewhat elliptic in outline viewed from above, glabrous, with the lower part of a slightly purplish colour, and the top varying from a pale pearl-grey to a yellowish or reddish-ochraceous tint, marked with few depressed white and branching yellowish-red lines. Flowers small, 7/4-1 inch in diameter, yellow. Capsule 5-celled. See fig. for large.

Pesembryanthemum Ruschii, Dinter in *Botanische Jahrbücher*, 1925, vol. XLIII, pp. 35 and 30 (125); *M. Ruschii*, Dinter in *Schwanter in Leitsch. f. Sukk.*, vol. II, p. 31, with fig. and *M. Ruschii*, Dinter and Schwanter on p. 22 (March 1925).

Great Namaqualand: In the neighbourhood of Gindanoek, near the Ithra Gorge, west, between Rossing and the old railway line, Rusch.

Mr. Dinter having published this under three different spellings of the specific name, I have adopted the earliest form of

117 spelling, which was published two years prior to the other variants.

L. terricolor, N. E. Br., in *The Gardeners' Chronicle*, 1923, vol. LXXIII, p. 35. The following completes the description of this plant, taken from living flowers and fruit. Calyx compressed from $2\frac{1}{2}$ -4 $\frac{1}{2}$ lines broad, 5-lobed, glabrous purplish-green; lobes 4-5 $\frac{1}{2}$ lines long, ovate, obtuse, with membranous edges. Corolla 10-17 lines in diameter, expanding in the afternoon, slightly scented; petals about 30, in 2 series, 4-6 lines long, $1\frac{1}{4}$ -3 $\frac{1}{4}$ line broad, linear, entire and obtuse at the apex, clear bright yellow. Stamens numerous, erect, collected into a cone, unequal, $2\frac{1}{2}$ -4 $\frac{1}{2}$ lines long; filaments white, ciliate at the base; anthers pale yellow. Stigma 5, overtopping the stamens, 3-5 lines long, light yellowish. Capsule 7-4 $\frac{1}{2}$ lines in diameter, obconic, 2-edged at the lower part, flattish or slightly convex at the top, whitish, with 3 valves and cells, and when expanded 5-7 lines in diameter; valves 1-1 $\frac{1}{2}$ line long and as much in breadth, triangular in outline, pallid; expanding-keels about as long as the valve, closely contiguous nearly to their tips, where they diverge and are furnished with broad, obtuse membranous, marginal wings; cells open, without cell-wings. Placentas on the floor of the cells. Seeds numerous in each cell, minute, about $1\frac{1}{4}$ line long, subglobose, smooth, pallid, with a brownish nipple.

Laingsburg Division: Near Grootfontein, Frith, Willmore Division: Near Miller, Frith.

L. Vallis Marise, N. E. Br. -- Growth $3\frac{1}{4}$ -1 $\frac{1}{2}$ inch long and 7-23 lines broad, obconic, with a transverse fissure $1\frac{1}{2}$ line or more deep across the top; lobes flattish or slightly convex on the top, half-elliptic or somewhat lunate in outline viewed from above, varying from nearly smooth or to more or less rugose on the top. Corolla 12-16 lines in diameter, yellow. Seeds $1\frac{1}{3}$ line long, white with a brown nipple.

Mesembryanthemum Vallis Marise, Dinter and Schwantes in *Zeitschr. f. Sukk.*, vol. II, p. 82, with fig., March, 1925.

Great Namaqualand: Marianthel Farm, Beetz.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 792-154. 1926.

(Continued from page 117.)

1.--CONOPHYTUM, Haw.

(Additions and Corrections; see vol. LXXVIII, p. 450).

In the *Zeitschrift für Sukkulantenkunde*, vol. II, p. 137 (December, 1925), Mr. G. Schwantes has proposed to separate from the genus *Conophytum* those species belonging to the same group as *C. bilobum*, *C. Elishae* and allies (and he also includes the very different *Lithons Friedrichiae* among them), and to form of them a new genus, to which he gives the name *Derenbergia*, stating that *Derenbergia* differs from *Conophytum* as follows:-- (1) by the absence

134 of bracts; (2) by having a 4-celled capsule; (3) by the shape of the growths. From this statement it would seem that Dr. Schwantes has neither dissected these plants nor even read my descriptions of them, or he would have found:--(1) that if flowering growths had been cut open a small pair of bracts would have been seen to be present upon the pedicel (which is concealed in the body of the growth) of the flower in *C. bilobum*, *C. Alishae* and allies,

ovary and capsule of *C. bilobum*, *C. Alishae* and some other species of is 4, 5 or 6-celled in different flowers of the same plant, and varies in different years. (3) As to the shape of the growths, that is only a specific, not a generic character. *Conophytum* contains several species may be grouped, and the groups mostly grade into each other without well defined limits.

Therefore, as there are no valid characters whatever by which *Derenbergia* can be separated from *Conophytum* it can only rank as a synonym of that genus. No other new species are described under that generic name, but some of the species described by myself are transferred to it.

When I described *C. Meyeri*, H. E. Br., in *The Gardeners' Chronicle*, 1925, vol. LXXVIII, p. 484, I described the growths as "sherry-shaped". Shortly after the plants were received, but now they have "plumped up", they are almost globose in form, with no trace of any compression.

I have also described *C. bilobum*, *C. Alishae*, *C. Meyeri*, *C. ...* in the same volume. The plants are now in the garden, and I have no further proof.

4.--*RIMARIA*, H. E. Br.

Stemless, succulent perennials, with the growths under natural conditions usually crowded upon the top deeply descending rootstock, rarely solitary. Growths subglobose or compressed-ovoid, formed of two (or when forming a new growth, four) hemispherical or thick, ovate, equal or unequal, leaves united for half or two-thirds of their length, and their free parts pressed closely together, entire or with minute teeth on their edges and sometimes

with microscopic soft points, green or whitish, or ashy-grey, without dots. Flowers solitary. Pedicel partly or at least the ovary exerted, bearing a pair of bracts included in the body of the growth. Calyx subequally 4-9-lobed down to its union with the ovary. Petals numerous, free, in about 3 series, linear. Stamens numerous, erect, no staminodes. Style none; stigma 7-15, erect filiform. Ovary inferior, 7-15-lobed; placentae on the floor of the cells. Capsule shallow, flattish on the top, with 7-15 valves and cells; valves, when wetted, widely spreading or more or less diverging, with broad, membranous, marginal wings; cell-roofed with flat, flexible, membranous, semitransparent cell-wings; no tubercle at the opening. Seeds many in a cell, very small, subglobose, with a nipple at one end, smooth.

Species 4, native of the tropic region of South Africa. The type of the genus is *R. Reethii*, H. E. Br.

The name is derived from the Latin, *rima*, a cleft or fissure, in allusion to the crack-line cleft between the closely applied

135 faces of the leaves when the plant is at rest.

This genus is readily distinguished from nearly all others of Mesembryanthemum tribe by its dwarf, stemless habit, subglobose or compressed-obovoid or oblong growths of firm substance, with the two leaves of which they are composed closed tightly together during the resting period. The only genera with which it can be confused are Gibbaeum and Didymaotus. From those few species of Gibbaeum that have equal or subequal leaves, the firmer substance of the growths, and the more numerous (7-15) stigmas, valves and cells of the ovary cell distinguish it; and from Didymaotus, the absence of dots upon the growths, the central (not lateral) flowers and more numerous stigmas readily separate it. The sectional structure of the flower resembles that of Lithos, but in its vegetative character, more numerous stigmas and cells of the ovary, and especially by the presence of cell-wings roofing the cells of the capsule, it is very different.

The diagrammatic figures (Fig. 66) showing the structure of this genus are not drawn to any scale; the figure of the capsule is about one-and-a-half times natural size.

KEY TO THE SPECIES.

- 1.--Surface of the growths microscopically puberulous, velvety to the touch; leaves or lobes with minute teeth on their edges and often along the faint keel. 5, Roodiae.

Surface of the growths glabrous, no teeth. 2

- 2.--Surface faintly rugulose and microscopically granulate, of a light dove-grey colour. 4, Fole Evansii.

Surface smooth, whitish, glaucous-green, or of a pale reddish tint. 3

- 3.--Growths 1-1 3/4 inch high, 8-15 lines broad and 6-10 lines thick; flowers white. 1, Heathii.

Growths 1/2-1 inch high, 4-8 lines broad and 3-6 lines thick; flowers unknown. 2, dubia.

1.--R. Heathii, N. E. Br. (Figs. 66, 67). Rootstock thick, or, under cultivation, at the ends of short prostrate branches, subglobose and from 1-2 inches in diameter or compressed obovoid and 1-1 1/2 inch high, 8-15 lines broad and 6-10 lines thick, with the fissure between the leaves 5-8 lines deep, and the top of the leaves rounded or faintly keeled, quite entire, smooth, glabrous, uniformly whitish to pale glaucous-green, or sometimes tinted brownish or reddish, without spots or other markings. Pedicel equalling or slightly exceeding the growths, stout, flattened with acute edges and 6-7 lines broad, glabrous. Calyx compressed, subequally 8-9-lobed, glabrous; lobes 2-4 lines long, 3-2 1/2 lines broad, oblong, obtuse, mostly with membranous edges. Corolla 14-16 lines in diameter, expanding about midday and closing at the latter part of the afternoon; petals numerous, in 2-4 series, free, subequal, 7-9 lines long and in 2-4 line broad, linear, ob-

1st tuse or acute, white. Stamens numerous, in several series, erect and loose or spreading so as to form a ring, 1½-2 lines long; filaments filiform, not dilated nor ciliate at the base, white; anthers creamy white. Stigmas 8-9, erect, with spreading tips, about 2 lines long, filiform or subulate, acute, green. Ovary flat or very slightly convex at the top, 8-9-celled. Capsule about 5 lines in diameter, very slightly convex, with 8-9 raised ridges on the top, and with 8-9 valves and cells; valves with the expanding-keels diverging from their base, adnate to about the middle of the valve with the upper part free, provided with broad, rounded, membranous wings that are often united in pairs between the valves; cells roofed with flattish membranous cell-wings, without a tubercle at the opening. Seeds very numerous in each cell, about 1 line in diameter, subglobose, pale brown, with a dark brown nipple, smooth.

Mesembryanthemum Heathii, H. E. Br., in Journ. Linn. Soc.

Vol. III, p. 37.
Ladismith Division: In the Klein Karoo between Garcia's Pass and Ladismith, Tillans 890; near Adams Kruis, Muir 3415; at Montewater, Muir 5665, 5776, and 5777 at Algernons Kruis, Muir 5775; and without precise locality, Muir 5773, 5774.

This very distinct plant was first introduced in 1906 by Mr. W. S. Tillans, who sent plants of it to Kew, which soon died; a capsule upon one of them was, however, given to Dr. R. H. Rodier Heath, who raised some plants from the seeds, which is the source whence most of the plants now in cultivation have originated.

According to Dr. J. Muir it is common locally in several parts of the Klein Karoo, and is known to the Dutch farmer by the name of "Vogelstruis Water," i.e., Ostrich-waters, as Ostriches eat them for the water that is contained in their succulent growths.

Kept constantly in a greenhouse, this plant seldom flowers, but in hot, sunny summers, if given as much open air treatment as possible, it is less difficult to get it to flower.

H. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 79: 135. 1926.

(Continued from page 135.)

2.--*R. dubia*, H. E. Br. Habit just the same as that of *R. Heathii*, with under cultivation the growths crowded upon short branchelets from the rootstock. Growth ½-1 inch long, 4-8 lines broad and 3-5 lines thick, obovoid, slightly compressed, with the two leaves of which they are composed usually more or less unequal in length and rounded at the apex, with the fissure between them 4-7 lines deep; surface smooth, glabrous, uniformly glaucous-green, without dots or other markings. Flowers and fruit unknown.

Mesembryanthemum fissum, H. E. Br., in Journ. Linn. Soc., vol. III, n. 67, not of

145 Haworth. South Africa: Locality and collector unknown.

I give this plant a distinctive name with some hesitation, because its origin and its flowers are unknown, and it is so much like *R. Heathii* that there is nothing but size and a rather different green colour to distinguish it from that species. In my experience, under the same conditions, it increases much more

150 freely and more rapidly than *R. Heathii* does, is always much smaller, and its growths are longer in proportion to their breadth and thickness. Four side l. side, and the lines certainly so distinct, and when the flowers of *R. dubia* are known, definite distinctive characters may be found.

It has long been in cultivation and is known in gardens under the name of *Mesembryanthemum fissum*, and is the plant I have mentioned under that name in the Journal of the Linnæan Society, as above quoted. For as the plant was known in gardens as *M. fissum* and agreed fairly well with Haworth's description, I at that time mistook it for that species. But I have since discovered that a drawing exists at New of the real *M. fissum*, which demonstrates that species to be entirely different generically and specifically from this which I now name *R. dubia*.

3.--*R. Roodiae*, H.B. K. (Fig. 76). Plant about 1½-2 inches high, consisting of a clump of growths crowded upon the short divisions of a deeply descending rootstock 6-8 lines thick. Each growth 1-1 ¾ inch high, with the basal part of the leaves united into a body ¾-1 inch long and ultimately withering into a sheath, their free part 4-9 lines long, 4-10 lines broad and 4-9 lines thick, ovate or somewhat hemispherical, flat on the face, usually very broadly rounded on the back, with an obscure or distinctly evident keel, and with or without small teeth 2-½ line long on the edges and keel; surface smooth, microscopically puberulous, green. Pedicels partly exerted, up to 9 lines long and about 2 lines thick, and together with the calyx puberulous like the leaves. Calyx 5-lobed; lobes 3-5½ lines long, broadly ovate, obtuse, 3 with a membranous margins. Corolla only seen in a withered condition, 1½ inch or more in diameter; petals about 5-7 lines long and ½-¾ line broad, linear, obtuse or notched at the apex, orange-yellow. Stamens numerous, collected into a cone, with some of the outer ones loose and spreading from the cone, apparently whitish. Stigmas 9-11, about 1½ line long, and much smaller than the stamens, filiform, a slightly darker colour than the stamens. Capsule when closed about 5 lines in diameter, flattened above and beneath; valves pallid within, with orange-brown expanding-keels. Seeds about ½ line in diameter, whitish, with a pale brown nipple.

Bushmanland: Precise locality not stated, Mrs. E. Rood.

This species differs from *R. Heathii* by its greener colour, microscopically puberulous surface, the minute teeth on the edges and keel of the leaves, and orange-yellow flowers. It so much resembles a dried specimen in Herbarium collected by the late Professor Pearson (No. 4071) at Enriet in Little Bushmanland, that at first I thought the two might be specifically identical, but I find the structure of the fruit of the two plants is so different that according to the modern conception of genera they ought not to belong to the same genus. For Pearson's plant has a half-closed capsule whose valves have stout (not thin) entire expanding-keels, with narrow and very small wings; the cells have stiff (not membranous) cell-walls forming a roof-like (not flat) cover to them, with their outer ends turned back and resembling the mouth of a trumpet, and the opening is nearly closed by a large tubercle. There is nothing of the kind in the fruit of *Rimaria*. It appears to be a case of one genus mimicking the other, of which there are many in the vegetable kingdom.

4.--*R. Fole-Evensii*, H. E. Br. (Fig. 77). Plant with usually only one or occasionally two growths to a rootstock, subglobose or pear-shaped, up to 1 3/4 inch in diameter, with the fissure 3-7 lines deep, and the top obtusely rounded, with a faint keel, very firm in substance; surface distinctly or very slightly rugulose, according to the water supplied, glabrous, microscopically granulate under strong lens, of a pale pink uniform pale dove-grey colour, with a faint yellowish or reddish tint, not dotted. Flower solitary, subsessile, with the calyx just inserted from the fissure. Calyx about 5-lobed; lobes 3-7 lines long, oblong, obtuse. Corolla about 15 lines in diameter, expanding at about half-past two in the afternoon; petals very numerous, in 2-4 series, ascending-serrate and imbricate, not spreading horizontally, 5-6 lines long, connately linear, obtuse, according to drawing the outer one of a delicate pink and the inner light yellow or yellow with pink tinge. Stamens numerous, collected into a compressed cylinder or a slightly conical mass, yellow. Stipules apparently about 12-15, filiform, longer than the stamens. Capsule, in the only one seen, elliptic in outline, 15 lines in its greater and 8 lines in its lesser diameter, convex and ribbed below, slightly convex on the top, with about 15 valves and cells. Seeds very numerous in each cell, very minute, subglobosely obovoid, minutely tuberculate, pale brown.

Mesembryanthemum Fole-Evensii, H. E. Br. in Journ. Linn. Soc., vol. XIV, 60 (July 1920).

Irish Division: Locality unknown, Le Leod.

I place this plant provisionally under the genus *Rhipid* with considerable doubt, for I have not seen a flower of it at present, and the only capsule I have seen was accidentally destroyed before I could examine its structure. The details given are partly compiled from drawings and are given photographs, one of which is her reproduced (Fig. 77), and partly from such remains of the flower as I could find on the capsule, and are therefore necessarily to some extent imperfect. Yet whether it belongs to this or some other known genus it cannot be mistaken for any other known plant, being one of the most distinct and striking of the stemless plants of this group that I have seen, its size, shape and the shining dove-grey colour always making it a very conspicuous plant when seen among other allied genera and species. In South Africa it flowers in May. It has a very meagre root-system and requires very little water. H. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 79: 172. 1920.

(Continued from page 156.)

(5.--*Gibbaeum*, Eow.)

Tufted, succulent perennials, stemless or with prostrate branching stems. Each growth consisting of an ovoid, obovoid, subglobose or obliquely subglobose body, slightly notched or distinctly and equally or unequally lobed at or just below the top, or transversely fissured or more usually an obliquely ovoid, oblong-ovoid or subcylindric body with a fissure on one side of it resembling a closed or slightly open mouth, formed of two opposite, equal, subequal or very unequal leaves more or less u-

172 nited into a solid body, or the unequal leaves more widely separated and spreading, but still united at the lower part. Flowers

fissure. Calyx 6-lobed down to the top of the ovary. Petals numerous, free. Stamens numerous, erect. Stigmas 3-7, plumose or filiform. Ovary inferior, 6-7 celled; placentas on the outer wall or floor of the cells. Capsule broadly obconic, convex at the top, with 6-7 valves and cells; valves with their expanding keels diverging from near their base and shorter than the valve, but when broad, membranous; obtuse marginal wings produced nearly or quite to the tip of the valve. Cells roofed with flexible membranous cell-wings, without a tubercle very small, ovoid, with a nipple at one end.-- Haworth, *Revis. Pl. Succ.*, p. 124, and F.E. Brown in *The Gardeners' Chronicle*, 1922, vol. LXXII, p. 129.

Species 11, natives of the Karoo region and apparently chiefly of the *Gibba* (Haworth) *Gibba* group, the chief genus being *G. rubescens*, H.E.Br.

The name is derived from the Latin, *gibba*, a hump, in allusion to the prolongation into a hump of the back of the larger of the two leaves of which the body or growth is composed, forming what appears to be the apex of the growth.

This genus is easily distinguished from *Mesenbryanthemum* and all other allied genera except *Conophytum* by its peculiar vegetative character, and from the former by its stigmas, constantly 6-7-celled ovary, 6-lobed calyx, and the 2-edged pedicels of its less rigid fruit. From *Conophytum* (for which genus I formerly mistook one species whose flowers I had not seen) the free petals and the presence of cell-wings roofing the cells of the capsule, readily distinguish it.

My former account of this genus was published in *The Gardeners' Chronicle*, 1922, vol. LXXII, pp. 129 and 151, at a time when very little was known of it in Europe, and I had then seen no flowers of any species belong to it. Since then one species has flowered here at Kew, and I am indebted to Dr. C. Muir for flowers of six other species that he has recently sent to me for examination, from which it would appear that the flowers of all the species of this genus exude a considerable quantity of nectar, which covers the whole surface of the top of the ovary and is also on the stigmas. I have also had more opportunity of studying some of the species under cultivation, the result being that I believe that Haworth's species as described there have not all been correctly understood. *G. rubescens* as there described by me is undoubtedly the plant Haworth called *Mesenbryanthemum rubescens*. But with reference to his *G. gibbosum*, *G. nerviride* and *G. luteoviride*, I am doubtful if these species are correctly understood in Europe. On p. 151 above quoted, I illustrated *G. nerviride* and *G. gibbosum*. The plant I figured as *G. nerviride* here produced (Fig 31,) I had cultivated for many years under that name, which I believe was the name under that name, which I believe was the name sent with it from South Africa, and as it agreed fairly well with Haworth's description I accepted it as being correct.

FIG. 31.-- *Gibba gibbosum*.
(From a drawing.)

172 But the plant figured on the same page as being probably *G. gibbosum*, here reproduced (Fig. 30), although then so different in appearance and colour, has now developed into a plant identical in every respect with that I figured as *G. perviride*, and although I have not yet seen flowers of either I feel certain that they belong to one and the same species. And so far as I can judge from his *G. perviride* and *G. luteoviride* are still unknown species. I therefore propose to cancel my previous descriptions of these two species and replace them with translations of those given by Horvath. The description of *G. gibbosum* being correct as far as I can at present tell it and taking into account that the figure and description of the growth (not of the flower) of *G. perviride* merely represents the cultivated appearance of *G. gibbosum*, both figures being here reproduced (Figs. 30 and 31), those descriptions and figures must suffice for the present for all that is at present known to me of *G. gibbosum*. It is very unfortunate that the localities of numerous species described by Horvath are quite unknown, for had the locality where they were found been stated it would have enabled us with more certainty to identify some of the plants he described that are at present unknown.

Although Horvath's descriptions of these plants are vague, yet from his sectional characters of them as a group there can be no mistake as to the kind of plants he describes, for to the group or genus he assigns the following characters:-- "Leaves opposite, an inch long, very stout, united almost to the middle, one abbreviated, gibbous, the other much enlarged at the apex and oblique. Calyx usually 6-rid. Corolla small, rubicund, flowering in winter and spring."

Fig. 32.-- Floral structure of *Gibbeum*.

A. and B. Section through flower, and transverse section of ovary of *Gibbeum pubescens*. C. stigmas of *G. huii*. D. stigmas of *G. molle*.
All enlarged two diameters.

Fig. 32 is a diagram representing the floral structure of this genus, from which it will be noted that the stigmas of the various species noted vary very considerably in size and character, affording excellent specific distinction. All the figures are drawn to the same scale of being enlarged two diameters, so that it will be seen that the difference in the size of the stigmas is very pronounced. H. L. Brown.

(To be continued.)

MESEMBRYANTHEAE.

Gard. Chron. III. 73: 194. 1926.

(Continued. From page 172.)

3.--LITHOPS, K. L. Br.

(Correction).

174 The name *Lithops Ruschiana*, K. L. Br., on p. 113 should be corrected to *Lithops Ruschiornu* K. L. Br., and the name *Mesebryanthum Ruschianum*, Pinter, erased from the synonymy. Mr. Wess has pointed out to me that I have made a mistake in supposing

194 that the names *H. Ruschianum* and *H. Ruschiorum*, Dinter belong to the same plant. There is no description of *H. Ruschianum*, merely a brief sentence in German (quite inadequate for identification) indicating that it is a shrubby species, which I regret to say I did not heed, as I had no suspicion that, contrary to usage and common sense, the same author would use two such slight variants of the same name for different species of the same genus. Dr. Dinter does not admit *Lithos* as a distinct genus, but uses it merely as a section of *Hesperantherum*, his names being published thus:-- *Hesperantherum* (*Lithos*) *Ruschiorum*, Dint.

5.--*GIBBERUM*, HAM.

I would here like to state that the following account of the very remarkable and interesting plants composing this genus has only been made possible by the invaluable and freely given aid I have received from Dr. J. Muir of Riversdale, who has contributed material of most of the species of this genus accompanied by ample notes, of which I have made free use in the following descriptions.

KEY TO THE SPECIES.

(Including those that have been introduced from the Cape.)

- 1.--Base of the notch or fissure not extending across the broadest part of the growth and normally small and situated obliquely at or near the top of it; growths soft in substance or pulpy, light green, sometimes tinted purplish; flowers bright rose pink.

Base of the fissure (or, when under cultivation the two leaves composing the growth are separated and spreading, the base of the gap between the leaves) extending across or situated at the broadest part of the growth, usually distinctly lateral, except in *G. album* and *G. discar*, where the fissure (in native-grown plants) extends across the oblique top, as the two leaves composing the growth are sometimes subequal; growths moderately firm, silvery white, greyish or green; flowers rose or white.

- 2.--Growths pubescent with outstanding fine hairs distinctly visible to the naked eye, *pilosulum*

Growths glabrous or if faintly velvety to the touch without a visible pubescence. *molle*.

- 3.--The part of the larger leaf or lobe above the mouth of the fissure (which is basal), 3-4 times as long as the smaller leaf or lobe and subterete, 4 lines thick; flowers rose. *geminum*

The part of the larger leaf or lobe above the mouth of the fissure or (when under cultivation the leaves of the growth are spreading) above the flat upper surface of the leaf rarely more and usually less than twice as long as the entire smaller leaf or lobe and occasionally very little longer than the latter, and (unless the plant is

- 4.--Growths in nature covered with a silvery-white or greyish-white pubescence, sometimes tinted reddish, under cultivation often becoming green or greenish, but with the whitish pubescence evident on the young growths and usually visible under a lens; softly or somewhat harshly velvety to the touch.

5

Growths always green, yellowish-green or dull glaucous-green; glabrous.

8

- 5.--Growths elongated, somewhat resembling a shark's head, with the closed fissure regularly transverse and distinctly at one side of the growth.

6

Growths obliquely ovoid or subglobose-ovoid, with the closed fissure more or less on the oblique upper side of the growth, usually not much like a shark's head and if so with the fissure transversely oblique, the smaller lobe of flowering growths with a furrow in which the radicle sits.

7

- 6.--Pubescence of fine, simple hairs closely pressed upon the surface of the growths and directed downwards, easily seen with a lens; flowers bright rose-pink.

pubescens

Pubescence microscopic, formed of minute modified hairs with very short radiating branches at their apex.

Shandii

- 7.--Pubescence softly velvety to the touch, scarcely visible even under a lens, but under a microscope seen to be composed of a dense felt of minute, much branched hairs; radicle exserted, 2-3 lines long; flowers white.

album

Pubescence somewhat harshly velvety to the touch, distinctly visible under a low power lens, composed of a dense covering of minute, simple, spreading hairs; radicle not exserted, very short or almost none, apparently not more than 1 line long; flowers not seen.

dispar

- 8.--Thin stems stout and flattened, naked except just under the growths, prostrate, with erect stout flattened branches; petals rose or rose-rubra; stigmas about 1½ line long, spreading, very stout and probably glabrous, acute.

auri

Stems none or weak, but the species are imperfectly known (see description).

9

- 9.--Growths when at rest under natural conditions obliquely ovoid with a closed, mouth-like fissure just below the middle on one side and of a dull glaucous or pale greenish-green, but under cultivation developing very

unequal spreading leaves of a cross-green or slightly yellowish-green colour and a more or less shining; petals rubicund with outer margins; stigma's erect, very short. gibbosum

Growth's punctate (see note under description), deep gloss green, with linear-oblong, semi-cylindrical-triangular or subovate leaves; petals uniformly rubicund; stigma's as long as the stamens, very spreading, subulate, with recurved tips, subplumose. perviride

Growth's yellowish-green, with oblong semi-cylindrical leaves, triangular above; petals pale rubicund, with a darker midline and the sides at the base whitish; stigma's much shorter than the stamens, very plumose, at length spreading. luteoviride.

H. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gerard. Chron. III. 70: 213. 1926.

(Continued from page 195.)

5.--GIBBOSUM, H.B.

G. album, H. E. Br. (Fig. 105, c).-- Sterile, in the plants seen, 1-1½ inch high, with a clump of growths crowded upon the stout rootstock, which has stout, fibrous roots. Growth's as received varying from irregularly and obliquely subglobose, and 9-10 lines in diameter, to obliquely ovoid and 9-15 lines long, 8-11 lines broad and 6-8½ lines thick, formed of two subequal or unequal short leaves with their flat faces closely pressed together, with the fissure between them 3-4 lines deep and usually oblique in both transverse and vertical directions, but when the two leaves are subequal is nearly central and subvertical. The two leaves or lobes in side view are very obtusely rounded at the top, not at all compressed, both are slightly and obliquely keeled, and the smaller one often has a concave groove at its side in which the pedicel of the flower of the previous growth fits; surface smooth, glabrous to the eye, but velvety to the touch, and under a very strong lens seen to be covered with a microscopic pubescence, pale whitish-grey or whitish in nature, probably becoming pale green under cultivation. Flowers solitary, terminal, exserted from the fissure, and by the development of the new growth appearing to be at the side of the latter. Pedicel about 6 lines long and acute edges, and together with the calyx having the same velvety surface and colour as the growths. Calyx subequally 6-lobed; lobes about 7 lines long and 2-2½ lines broad, elliptic or elliptic-oblong, rounded at the apex, without (or only one of them with narrow) membranous edges. Corolla about an inch in diameter, expanding at about midday and closing about half-past three in the afternoon, gradually enlarging until about the third day, when they attain their full size, according to Mr. Muir; petals very numerous in several series, 4-5 lines long, 1¼-1½ line broad, linear, obtuse, the inner row becoming filiform staminodes, all pure white. Stamens numerous, about 1½ line long, erect, white. Stigma's 6, erect from a slightly spreading base, nearly 1 line

C. cernuum, H. E. Dr.-- Plant growing in masses up to 1 foot in diameter, ex Dr. J. Muir. Growth more or less purplish at the base. Flower solitary, terminal, with the pedicel exerted about 2 lines from the orifice, not bracteate. Calyx subequally 3-lobed; lobes about 2 lines long, oblong, obtuse, keeled, four or five with narrower, membranous edges. Corolla rather small, about 1/2-1 inch in diameter; petals apparently in 1-2 series, about 2 1/2 lines long and 1/7-1/2 line broad, cuneately linear, obtuse or slightly toothed at the apex, entirely white except to the base. Stamens erect, in about 7 series, 7/4-1 1/2 line long, apparently creamy-white; filaments not ciliate nor dilated at the base. Stigma 3, erect, about 1/2 line long, subulate, acute, green. Top of the ovary green.

Ledisith Division: Klein Karoo, at Land ... ex, Muir 1884.

The above particulars complete the description given previously in *The Gardeners' Chronicle*, 1888, vol. LXXI, ...

C. luteoviride, H. E. Dr.-- "Stems prostrate, weak, 3-4 inches long. Leaves larger and longer than in *C. nerviride*, oblong, semi-cylindric, triquetrous above, yellowish-green. Flowers terminal, sessile, solitary. Calyx 3-lobed, 2-edged at the base; the two outer lobes larger, keeled, obtuse, the other flat, subovate, retuse, surrounded by purplish membrane. Corolla almost as in *C. nerviride*; petals numerous, somewhat imbricated at the base, rather broad or cuneately linear, often notched at the apex, pale pink-cream, with darker midline; the sides at the base whitish. Filaments (i.e., stamens) spreading, about one-third as long as the petals; anthers sulphur-yellow. Styles 3, strongly plumose, at length spreading, but very short, and much shorter than the filaments.

Flowers in January. Introduced in 1795."

C. nerviride var. *luteoviride*, H. E. Dr., in *The Gardeners' Chronicle*, 1888, vol. LXXI, p. 151. *Mesembryanthemum luteoviride*, How. Synon. Fl. Succ., p. 223 (1812). *C. nerviride* var. *D.*, How. Misc. Bot., p. 57.

South Africa: Locality and collector unknown but the latter was probably Messon.

The above description is all that is known of this plant.

C. rolle, H. E. Dr. (Fig. 93 D., p. 172).-- Stemless. Rootstock deeply descending, branched, firmly fleshy, bearing a column of many growths. Each growth (as received) compressed-subglobose, becoming under cultivation more elongated and obliquely ovoid or obovoid, 9-18 lines high, 6-10 lines broad and 6-9 lines thick, slightly or distinctly and more or less unequally 3-lobed at or 2-3 lines below the top, with the notch or fissure separating the lobes 1 1/2-2 lines deep; when the notch is at the top the lobes are obtusely rounded and scarcely keeled, when below the top the latter is more or less pointed and the growth more or less resembles a shark's head; substance rather soft and pulpy; surface smooth, glabrous, uniformly pale green or sometimes pinkish, not dotted. Calyx 6-lobed, with the ovary-part included in the body of the growths; lobes 1 1/2-2 1/2 lines long, ovate, obtuse, some with broad membranous margins. Corolla spread over the top of the growth, only seen in a withered condition, an inch or more in diameter; petals numerous, 4 1/2-6 lines long, 1-3/4 line broad, cuneately linear, obtuse, rose-pink, stamens numerous, erect, about 2 1/2 lines long, white or creamy-white. Style about 1 1/2 line

116 long, moderately stout, stamens 7, ascending-spreading or recurving, 1-1½ line long, filiform and more or less plumose. Ovary inferior, flat at the top, 7-celled; placentas on the outer wall of the cells.

Edinburgh Division: Klein Karoo, on hills at Adams River, 1,300-1,400 ft. alt., Muir 3310. Montagu Division: between Louwfontein and Allenburgfontein, Muir 3706. Also found by Dr. Muir at Werthius Klip in Riversdale Division.

This species was very kindly sent to me by Dr. J. Muir.

I have also what I believe to be the same species sent to me by Dr. R. Harloth (number 11879) from the Edinburgh Karoo, but it has not yet flowered.

Dr. Muir informs me that it grows in clefts between the upturned edges of the dry, friable laminated Bokkeveld shales, flowering in July and August. Also that when cultivated in its own region it is a soft and delicate species, not very tolerant of water, the rainfall of that region being less than 17 inches yearly. This statement agrees fairly well with my experience of it, which is that if watered too frequently the growths are apt to split open, so that a fair amount of neglect suits it very well. Dr. Muir also informs me that in its appearance and colour this species somewhat resembles the broken shales among which it grows, and that hares, antelopes and other animals eat these plants and their allies.

G. Muiri, N. E. Br. (Fig. 105 a. and Fig. 82 c. p. 172).-- Plant growing in masses, with longer prostrate main branches and to Dr. J. Muir. Branches in one specimen seen naked at a short distance below the growths, and 2½-3 lines in diameter, forking and becoming more or less flattened, and in the specimens seen 2½ inches long, forking three times in that length. Growths 3/4-1½ inch long, 2-11 lines broad and 3-9 lines thick, obliquely ovoid, slightly compressed, very unequally two-lobed at the top, the longer lobe 2-4 lines long above the 3-4 line deep fissure between them, both lobes more or less compressed, obtusely rounded at the apex in side view and distinctly keeled over their tops; surface smooth, glabrous, shining, the lower or greenish-yellow (according to Dr. Muir the "natural colour is of a pale, somewhat sickly greenish-yellow"), having a rather unhealthy appearance. Pedicel slightly exerted from the fissure, glabrous. Flowers only seen in a withered condition. Calyx 3-lobed down to its union with the ovary; lobes subequal, 2-2½ lines long and 1 line broad, oblong-ovate, obtuse, the inner with membranous margins. Petals numerous, in about 2 series, 3-8 lines long, ½ line broad, cuneately linear, obtuse, rose or rosy-purple apparently to the base. Stamens numerous, erect, about 3 lines long, white, surrounded by some linear-filiform white staminodes. Stigma 6, about 1½ line long, reflecting on the top of the ovary, 1½ line long, reflecting on the top of the ovary, very stout or probably plumose, acute; no style. Ovary inferior, flattish on the top, compressed and two-edged, 6-celled, with placentas on the outer wall of the cells. Capsule (closed) about 3½ lines in diameter, with 6 ridges on the slightly convex top, 6-valved and 6-celled; valves pallid, with their dark brown expanding keels diverging from the base, slightly incurved at the tips, with broad, membranous, rounded, obtuse marginal wings; cells roofed with membranous callus, and the openings marked with a pallid spot, but without a

tubercle. Seeds minute, about 1 line long, ovoid, villi with a brown nipple.

Montana Division: Between Lewisfontein and Allenborgfontein, 8,000 ft. alt., Nuri 3704.

This is a rather peculiar species, which I have much pleasure in naming after its discoverer, Dr. C. Muir. Beneath each growth are 6-10 old sheaths, the remains of former growths, and below these sheath the branches and stems are naked and remarkable in their formation, for instead of the part below where a branch arises becoming terete it becomes flattened, and has the appearance of the new branch becoming decurrent and fused with the older part. I do not remember to have seen any other quite like it, and it certainly deserves investigation.

H. E. Brown

(To be continued.)

DESCRIPTION.

Genl. Chron. III. 79: 234. 1926.

(Continued from page 215.)

216.

5.--*GIBBOSUM*, HAW.

G. nerviride, H. E. Br.-- "Plant of dwarfish growth, stemless when young; when old may possibly acquire a short trailing stem like *G. fissum*." In another place Haworth writes: "Stem prostrate, 3 inches or more long." "Leaves about an inch long, when not drawn up weak, connate, punctate, perfect ones unequal, of a deep rosy green colour, semicylindric or subround, or in other words linear-oblong, convex on the outside and plano-concave on the inside, particularly from the middle downwards to the base, with a slight compression near the points, which are blunt." At other places the leaves are described as "Leaves oblong" or "semicylindric-triquetrous or sub-ovate, very green." "Peduncle solitary, axillary, very short, 3-angled. Calyx small, unequally 6-fid as in *G. gibbosum*. Corolla a little larger and wider than in *G. gibbosum*. Petals very obtuse uniformly rubicund. Filaments (i.e. stamens) numerous, short, spreading, white. Anthers yellowish. Style 6, very spreading, as long as the filaments, subulate with the tips recurved, subvillose."

"Flowers in March, before noon, but very rarely." Mesembryanthemum nerviride, Haw., Obs. Mesemb., p. 133 (1703); Disc. Nat., p. 37; Synon. Fl. Succ., p. 327; and Rev. Fl. Succ., p. 104.

South Africa: Locality and collector unknown.

The above contains the whole of the descriptive characters given by Haworth. Although he originally described the leaves as "punctate," he does not repeat that character in his other descriptions, and I believe that the dots alluded to were merely spots upon the leaves made by insects or some other cause (as we have found to happen in other genera occasionally) and not subsequently seen upon the plant, and therefore not afterwards mentioned. For I believe that such as are found on various species of true Mesembryanthemum.

G. nilosolum, H. E. Br. (Fig. 119).-- Grows under natural conditions 6-9 lines in diameter and subglobose or obcordately obovoid, but under cultivation becomes 12-13 lines high, 3-12

354 lines broad and 3-8 lines thick, obovoid, with the lobes at the top very unequal; substance soft and fleshy, rubescent with fine spreading hairs, light green, not dotted, suffused with purple when exposed to bright sunshine. Pedicel included in the body of the growth, without bracts, moderately stout, green, adpressed-rubescent. Calyx, with the exception of the tips of its lobes, included in the body of the plant or perhaps sometimes exerted, 6-lobed down to its union with the ovary, pubescent; lobes about 2 lines long, oblong, obtuse, green, 4 of them with membranous edges. Corolla 6-8 lines in diameter, expanding in daytime, scentless; broad, linear, obtuse, bright pink. Stamens very numerous, erect; filaments white, not pubescent near the base; anthers pale yellow. Glands about 7 separate, dark green. Style none; stigmas 7, erect, with spreading tips, 2 $\frac{1}{2}$ lines long, filiform, pale yellowish. Ovary inferior, convex on the top, 7-celled; placentas on the outer wall of the cells.

Conophytum pilosulum, H. E. Br., in The Gardeners' Chronicle, 1922, vol. LXXII, p. 214.

Edinburgh Division: near Tlouaberg mountains, in a clayey subsoil covered with sand, Pole Evans, 3927. Between Gondwater and Harbad, 1,700-2,000 ft. alt., Fair 3650.

I originally described this plant as being a species of

since in every way suggests that it belonged to that genus, although rubescent and softer in substance, for the presence of cell wings to the cells of the capsule did not at that time appear to me to be such an important generic character as I now find it to be.

This plant having now flowered at New, I find that its floral structure is altogether different from that of *Conophytum* and identical with that of *Gibbaea*, the calyx and corolla both being without a tube, the pedicel bractless (in *Conophytum* the pedicel enclosed in the body of the growth always has a pair of minute bracts near its base), and the cells of the capsule roofed with membranous cell-wings. I have therefore here given a more perfect description of the plant.

usually lobed than when received from South Africa, where they are in form.

Fig. 119 is from a photograph sent to me by Dr. Pole Evans, and represents this species as it grows under natural conditions in South Africa.

G. rubescens, H. E. Br.-- having now been able to examine some flowers of this species preserved in fluid, the following description of them may replace that given in The Gardeners' Chronicle, 1922, vol. LXXII, p. 129: Pedicel not exerted from the fissure, rubescent with reflexed adpressed white hairs. Calyx subequally 6-lobed, pubescent like the pedicel and whole plant; lobes about 2 line long and $1\frac{1}{2}$ -2 lines broad, oblong or ovate, obtuse, lobed down the back. Petals numerous, free, 4-5 lines long, $1\frac{1}{2}$ -2 line broad, linear, obtuse, bright rose pink. Stamens numerous the outer about $1\frac{1}{2}$ line long, the inner shorter, orange-white, with the filaments rubescent at the base. Glands dark black. Stigmas 6 erect, $1\frac{1}{4}$ line long, subulate; no style. Ovary convex on the top, 6-celled; placentas on the outer wall of the cells; ovules numerous in each cell.

G. pubescens, N. E. Br., in 'The Gardeners' Chronicle', 1922, vol. LXXII, p. 129, fig. 34, A.-B., where the full synonymy is given.

Ladismith Division: At Rondevaal, 1,7000-2,000 ft. alt., flowering in August, Fair 7662.

I am informed by Dr. Fair, who sent the flowers to me, that this species grows in clumps that are up to 6 or 8 inches in diameter, and that when in flower it makes a fine sight, being covered with its rather rosy flowers. As previously stated, this plant alters its appearance under cultivation in the climate of Great Britain.

255

G. Shandii, N. E. Br.-- I am informed by Dr. C. Fair that it grows in South Africa; this species differs from its close ally, *G. pubescens*, not only by the nature of its pubescence, but by being greener in colour and by the larger leaf being different in shape and incurved. The flowers of this species are at present unknown.

G. Shandii, N. E. Br., in 'The Gardeners' Chronicle', 1922, vol. LXXII, p. 129, fig. 34, C.-E.

N. E. Brown

(To be continued.)

MESSELYNIAE UL.

Gard. Chron. III. 79: 267. 1926.

(Continued from page 23.)

3.--ARGYRODERM, N. E. Br.

28

Stemless succulent perennials, tufted, or each plant consisting of a single growth. Leaves 2 (or when a new growth is forming 4, or under cultivation sometimes 6) to a growth or plant, opposite, short and thick, ovate, flat above, very convex on the back, firm, very smooth, white or whitish-green, not dotted. Flower solitary, terminal, sessile or subsessile, bracteate. Calyx produced above its union with the ovary into a short, cup-like tube, 3-5-lobed above. Petals numerous, free, linear, arising from the top of the calyx-tube. Stamens numerous, in several series, arising from the top of the calyx-tube, the uppermost erect or ascending, and the other abruptly bent down the calyx-tube, forming a ring at the mouth of the tube, with a central opening. Stigma one, sessile, circular or elliptic, usually entire, rarely faintly crenulate. Ovary inferior, 10-24-celled; placentas on the floor of the cells. Capsule very shortly and broadly obconic, flattened at the top, with 10-24 valves and cells; each valve with a pair of stout, diverging, expanding-beels ending in sunlike or linear point, not winged; cells shallow, roofed with flexible semi-transparent cell-walls and the opening nearly closed by a large tubercle. Seeds numerous in each cell, minute, globose-ovoid, with a nipple at one end, smooth.-- N.E.Br. in 'The Gardeners' Chronicle', 1922, vol. LXXII, p. 92.

Species 5, besides one that is doubtful; native of KwaZulu and Van Rynsdorp Division in South Africa. The type of the genus is *M. testiculare*, N. E. Br.

The generic name is derived from the Greek, argyros, silver, and derma, skin, in allusion to the silvery-white colour of the very smooth skin of the leaves.

Fig. 171. shows a sectional diagram of the structure of the

68 structure of the flower of *A. testiculare* var. *roseum*, with some of the stamens, and a portion of an expanded capsule showing three cells roofed with cell-wings and the opening closed by a large tubercle, also two valves with their armed expanding-keels, all-enlarged, but not to the same scale.

Fig. 171.-- *Argyrodernis testiculare*.

A, diagram of flower structure; B, stamens; C, three cells and two valves of the capsule.

The previous description of this genus was made from material that I was not at liberty to dissect; that now given has made for living flowers.

The only other known genus of the Mesembryanthemum Order having a similar type of structure and a circular, sessile stigma is *Roodia*, from which the shorter, ovate, white leaves, subsessile flowers, erect or ascending uppermost stamens and mindless expanding-keels of the valves of the capsule readily distinguish it.

The following is an enumeration of the species hitherto placed under this genus, together with description of another that may or may not belong to it, but seems nearly allied and is best placed here until it can be properly examined.

Fig. 182.-- *Argyrodernis testiculare*, L. f. f. f.
Flowers white; natural size.

A. crateriforme, W.E.Br.-- Growths with two leaves, according to description united at the base into a solid body 6-9 lines long, with their flat faces about 9-10 lines long and 11-13 lines broad, subrhomboid as seen from above, subtruncate at the apex (possibly in side view), thence rounded and slightly narrowed towards the base, obliquely and very obtusely keeled on the back, smooth, glaucous-green. Flower terminal, subsessile, with a pair of bracts up to 6 lines long at its base. Calyx produced above the ovary into a short cup-like tube, slightly constricted at the top, 6-lobed above, 2-2½ lines long, ovate, obtuse, four of them with membranous margins. Petals numerous, in several series, the outer about 7 lines long and ¾-3/4 lines broad, the inner smaller, 1½ lines or more long, cuneately linear, rose-purple. Stamens 1½-2 lines long, white; the upper nearly erect, the others all bent down into the tube of the calyx; filaments bearded at the base. Pistil (claw?) annular, of many short segments. Stigma 14, scarcely ½ line long, radiately spreading and closely pressed upon the flat top of the ovary.-- *Mesembryanthemum crateriforme*, L. *Polus in Ann. Bot. Hort.*, vol. III, p. 165 (1924).

Van Rhynsdorn Division: Gerrit Van Rhynsdorn, botanist.

I have not seen this species, but according to the description given (translated above) it would appear to belong to this genus. The only difference is that the stigma would appear to be separate, instead of all-united into one entire or faintly crenate sessile stigma. The capsule however, is not described, so

A. Durle, H. B. Gr.-- in *The Gardeners' Chronicle*, 1902, vol. LVII, p. 105.

A. Margaritae H. B. Gr.-- Synonyms, *Mesechryanthemum Margaritae*, Schrenke in *Monatschr. f. Gart. u. Landw.*, 1910, p. 55, with fig. *Argyrodendron roseatum*, H. B. Gr. in *The Gardeners' Chronicle*, 1901, p. 105, p. 106, p. 107.

The name *A. Margaritae* is published unknown to me three years earlier than *A. roseatum*, and must therefore take precedence. Its native locality is near Graham's, in Great Queensland.

Fig. 157.-- *Argyrodendron Margaritae*, H. B. Gr.
(Syn. *Mesechryanthemum roseatum*, Gard. Chron. Vol. LVII, p. 105; p. 233)

A. neesii, H. B. Gr., in *The Gardeners' Chronicle*, 1902, vol. LVII, p. 105. The lower styles are all inflexed into the calyx-tube (see fig. 154).

A. subalbum, H. B. Gr., in *The Gardeners' Chronicle*, vol. LVII, p. 97.

A. testiculare and its varieties *lutum*, *roseum* and *lanceolatum*, H. B. Gr., in *The Gardeners' Chronicle*, 1902, vol. LVII, p. 97. Having now dissected living flowers of this species (figs. 152 and 153), which I had not been able to do previously, I find that the stamens are in several series and about 1 1/2 line long, the outer or innermost erect or ascending and all the others bent down into the calyx-tube, leaving a central opening; the filaments of all but the outer are adnate at their base and white; anthers pale yellow.

As I have been informed that in South Africa the figure (here reproduced Fig. 155) of *A. Margaritae* (H. B. Gr.) in Gard. Chron., vol. LVII, p. 105) has been mistaken by some as representing a young plant of *A. testiculare*, I would like to remove this error by stating that the figure quoted, I believe, represents an adult plant, which seen by the side of plants of *A. testiculare* could never be confused with them for that species. As at present it is correct and correct, *A. testiculare* is not a plant of the same colour which *A. Margaritae* roseum is, nor is the two species, nor is the same species, *A. Margaritae* being native of Great Queensland, while *A. testiculare* grows further south, in Victoria and New Zealand.

(To be continued.)

Gard. Chron. LVII, 79: 103, 1902.
(Continued from page 233.)

7--20001, H. B. Gr.

308 ground branches. Leaves 2 to each growth or 4 when a new growth is made, opposite, united at the base, erect, subterete or stoutly semiterete, flattened on the face, firm and smooth, not dotted. Flower solitary, terminal, pedunculate and bracteate; calyx produced above its union with the ovary into a distinct tube, 6-lobed above. Petals numerous, free, linear, arising from the top of the calyx-tube. Stamens very numerous, arising from the top of the calyx-tube and all abruptly bent down into the tube in a ring. Stigma sessile, small, circular, entire. Ovary inferior, 12-15 celled, slightly concave at the top; placentas on the outer wall or floor of the cells. Capsule broad and shallow, flat at the top, with 12-15 valves and cells; each valve with two brown, expanding keels half as long as itself, having membranous marginal wings and ending in membranous points; cells roofed with rather rigid cell-wings, and the outer opening nearly closed by a tubercle.--N.E. Brown in Flowering Plants of S. Africa, vol. 2, t. 78 (1922).

The only known species and type of the genus is *R. digitifolia*, N. E. Br., a native of Van Rhynsdorp Division in South Africa.

The genus is named after Mrs. E. Rood, who discovered this plant, which is well-figured in the work quoted; a diagram of the flower-structure in longitudinal section is here given slightly enlarged (Fig. 158).

R. digitifolia, N. E. Brown.-- Plant forming somewhat lax clumps with underground branches 2-3 inches long when old. Leaves opposite, one pair to each growth (or under cultivation sometimes two pairs), erect, 2-4 $\frac{1}{2}$ inches long and 5-7 lines thick, half-cylindric or subcylindric, but flattened on the inner face, obtuse, smooth glabrous, green or suffused with purple at the tips. Peduncle 1-2 $\frac{1}{2}$ inches long, erect, with a pair of bracts near the middle, glabrous. Calyx produced above the ovary into a tube 3-3 $\frac{1}{2}$ lines long, 6-lobes above, and slightly constricted under the lobes, glabrous, green; lobes 2 $\frac{1}{2}$ -4 lines long and 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ lines broad, ovate, subacute or obtuse, four of them with membranous margins. Corolla about 1 $\frac{1}{2}$ inch in diameter; petals in about 4 series, the outer about 7 lines long and $\frac{1}{2}$ line broad, the others gradually shorter, linear, obtuse or notched at the apex, bright magenta. Stamens, stigma and ovary as described under the genus. Capsule about 7 lines long in diameter when closed and 12-3 lines in diameter when expanded, shallow, about 3 lines deep, very shortly and broadly obconic-convex beneath, flat, with 12-15 raised double ridges $\frac{1}{2}$ line high on the top, and with 12-15 valves and cells, light brown; valves narrow, 3 lines long, pale brown inside; expanding-keels diverging from their base, half as long as the valves, orange-brown, with a white membranous outer margin or wing continued into a linear, blunt appendage nearly as long as the valves that is often united to the appendage of the adjoining valve; cells radiating from a central boss 2-2 $\frac{1}{2}$ lines in diameter, roofed with pale brown flexible cell-wings and the outer opening nearly closed by a large, white tubercle. Seeds numerous in each cell, about $\frac{1}{2}$ line long, ovid, with a minute niple at the narrow end, smooth, light brown.-- N. E. Br. in Flowering Plants of South Africa, vol. 2, t. 78 (1922).

Van Rhynsdorp Division: Near Van Rhynsdorp, Mrs. E. Rood.

In the Annals of the Bolus Herbarium, vol. III, p. 165, Mrs. L. Bolus has stated that *Roodia digitifolia* is a synonym of *Mesembryanthemum brevipes*, Schlechter. I have not seen the latter plant, but feel sure that Mrs. Bolus is mistaken and am inclined

308 to believe that this statement is based upon some superficial resemblance of the two plants rather than upon a careful comparison by dissecting them both. For, according to the description of it, *M. brevipes* differs from *Roodia digitifolia* by having 4-6 leaves to a growth, very short peduncles, and 6 subulate stigmas nearly $1\frac{1}{2}$ line long, and therefore it would have only 6 cells to the ovary and capsule (which latter is not described), consequently it cannot even belong to the same genus as *Roodia digitifolia*. Until fresh material of *M. brevipes*, with good flowers and fruit be determined. Among the both annual and perennial species of this group there are several cases where the plants are so very similar in general appearance that they might easily be supposed to belong to the same genus or section, and in some cases have been mistaken for the same species, yet when carefully dissected and examined are found to have such a totally different structure that they cannot be associated in the same genus. There are plants having the same type of growth as *Roodia*, which certainly do not belong to this genus, but I have not yet been able to obtain both flowers and fruit of them, so at present I am unable to deal with them in any way. Many of these plants can only be properly determined by dissection and an examination of their fruit, as I have found from experience that similarity in appearance is often no guide to real affinity. N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 79: 406. 1926.

(Continued from page 308.)

8.--CHEIRIDOPSIS, N. E. Br.

406 Dwarf, succulent perennials, forming clumps. Leaves opposite, in nature only 1-2 pairs to a growth, but under cultivation up to 3 pairs are sometimes present at the same time, the alternating pairs often dissimilar in size; form or degree of union at the base, one pair being only shortly united at the base, and the next pair united from one-third to three-fourths or, in a few species, for nearly all their length, withering, and the basal part forming during the resting period a truncate sheath surrounding the next pair of leaves, or, in a few species, completely enclosing the new pair, which usually have their flat faces closely applied to one another, so that the pair somewhat resembles the beak of a bird; green, glaucous-green or white, often conspicuously dotted, sometimes without dots.

Flower solitary, terminal, usually with only one pair of leaves at the base of the pedicel, but sometimes also bearing another pair at or below its middle. Calyx 4-5-lobed down to its union with the ovary. Petals numerous, free. Stamens numerous, erect or more or less connivent. Stigmas 8-19 (in one doubtful species the stigmas and the valves and cells of the capsule are only 4-6), more or less plumose; no style. Ovary partly superior, becoming inferior in fruit, 8-19-celled; placentas on the outer wall or floor of the cells (Fig. 210). Capsule with 8-19 valves and cells (except in the doubtful *C. ventricosa*); valves narrow, widely spreading or reflexed when wetted; expanding-keels diverging upwards from the base or contiguous at the basal part and

406 then diverging, with membranous, awn-like or linear points, usually without marginal wings, but sometimes with narrow marginal wings at the basal half; cells roofed with cell-wings and the opening nearly closed by a large tubercle.

Species 25 (and one that doubtfully belongs to the genus), and probably several more, native of the Karoo region of South Africa, from Great Namaqualand southwards to Laingsburgh Division. The type of the genus is *C. tuberculata*, N. E. Br.

The generic name is derived from the Greek, cheiris, a sleeve, and opsis, like, in allusion to the truncate, withered sheath, which in many species (not all) when the plant is at rest under natural conditions surrounds the succeeding pair of leaves like a sleeve.

This genus corresponds with the section *Rostrata* of *Mesembryanthemum*, in books, but is distinguishable at sight from that genus by its peculiar habit, by its more numerous stigmas, and particularly by the structure of its capsule, which, when expanded, is a very pretty, flower-like object, from which alone this genus can usually be recognised.

It is remarkable for the manner in which some of the species show great variation in the vegetative characters of the same individual at different stages of growth. A common variation being that alternating pairs of leaves differ either in the length to which they are united, one pair being very shortly united or nearly free at the base, and the next pair united, sometimes for half or even more than half their length, into a solid-looking body that ultimately becomes a sheath to the next pair; or one pair is entire and the next pair toothed on the keel at the apex. In some species the variation is so great that the same individual seen only at two different periods of the year would certainly be thought to represent two different species, as will be shown in the figures of *C. peculiaris* and *C. cigarettifera*. It seems, however, that the peculiar appearance assumed during the resting season in their native country by some of the species is not, or but rarely, repeated in Europe under cultivation, probably because they receive too much water during the summer, while under natural conditions they get no rain during their resting period, the only moisture they then obtain being the slight amount obtained from dew, which would soon be evaporated by the hot sunshine.

I have sometimes been astonished at the enormous amount of shrinkage the leaves of some species of this genus will endure without any apparent ill effect. 211A represents a growth of *C. candidissima* in a state of rest, as it was when received by me from South Africa. The leaves then appeared to me to be little less than their full size as the wrinkles upon them were scarcely noticeable, yet when the plant rooted the leaves at once began to swell and elongate and speedily attained the size represented by Fig. 211B. It was evident that this was merely expansion from the absorption of water and not real growth, which takes place much more slowly and in a different manner. Therefore, it would appear that the tissues of these plants are of a somewhat elastic nature.

Members of this genus, as a rule, do not flower freely under cultivation in England, because they grow and flower during our cold season from December to April, and to enable them to do so they probably require plenty of sunshine and a day temperature of not less than 68° to 70° Fahr., as I have noticed that the flowers do not expand properly when the temperature is lower.

Unfortunately, I have not seen many flowers belonging to this

406 genus, and until this year had not noticed a peculiarity that seems to exist in reference to the fertilisation of certain species of this genus, which is this. The stamens shed their pollen before the stigmas are ready for fertilisation, being tightly closed together into a spire-like column while the pollen is being shed. This, of course, is a well-known feature in plant-fertilization, its purpose being to secure cross fertilisation. But in those flowers of *Cheiridopsis tuberculata* and *C. rostrata* and I have seen this year, when the pollen is all shed then the stigmas commence to separate and at the same time, or in one case just before the stigmas began to separate, the petals begin to wither and are quite faded while the stigmas seem to be quite fresh and receptive, a peculiarity I have not noticed in other flowers, yet in some species the stigmas are radiately spreading while the petals are in a perfectly fresh condition. The pollen seems all to fall among the stamens and is seen to be plentifully covering their filaments; therefore, I suspect that these plants are fertilised by very small insects and mites, which probably crawl through the mass of stamens to get to the nectar-glands, and thus convey pollen from flower to flower.

The presence of a pair of leaves (the so-called bracts) upon the pedicel above the basal pair has been thought to be a specific character, but I find on a plant of *C. tuberculata*, cultivated by Mr. Endean, some flowers are produced with and some without the extra pair of leaves on their pedicels on different growths of the same

407 plant and growing in the same pot. Therefore, the specific value of the presence of this pair of leaves is doubtful. I have preserved specimens showing this variation for the Kew Herbarium.

I am unable to make a key to the species of *Cheiridopsis*, because I have no material adequate for the purpose. Therefore I can only give a list of the species I refer to this genus, giving reference to the original descriptions and any subsequent figures, the descriptions of later authors being omitted, as they are often imperfect or erroneous:--

C. bibracteata, N. E. Br.-- *Mesembryanthemum bibracteatum*, Haw. Syn. Pl. Succ., p. 213 (1812). N. E. Br. in Journ. Linn. Soc. Bot., vol. XLV, p. 77, t. 6, fig. 14; and *M. rostratum* var. *brevibracteatum*, Salm Dyck, *Mesembryanthemum* 3, fig. 7b.

C. bifida, N. E. Br.-- *Mesembryanthemum bifidum*, Haw. Misc. Nat. p. 29 (1803), N. E. Br., in Journ. Linn. Soc. Bot., vol. XLV, p. 78, t. 9, figs. 34, 35; and *M. multipunctatum*, Salm Dyck. Hort. Dyck., p. 357 (1823), and *Mesemb.* 3, fig. 6; Berger, *Mesemb.*, p. 256, fig. 55, 1v.

C. candidissima, N. E. Br. (Fig. 211).-- *Mesembryanthemum denticulatum* var. *candidissimum*, Haw. Obs. *Mesemb.*, p. 151 (1795) Ann. S. Afr. Mus., vol. IX, p. 142, t. 3, and *M. candidissimu*, N. E. Br. in Journ. Linn. Soc. Bot., vol. XLV, p. 79, t. 7, figs. 25, 26. My figure at this place represents only a small, starved plant, as I find this species attains to two or three times the dimensions there depicted, as is presented in Fig. 211 b.

C. carnea, N. E. Br.-- Described later.

407 *C. Caroli-Schmidtii*, N. E. Br.-- Described, figured and synonymy given later.

C. cigaretifera, N. E. Br.-- Described and synonymy given later.

C. cuprea, N. E. Br.-- Described later.

C. denticulata, N. E. Br. and var. *glauca*, N. E. Br.-- *Mesembryanthemum denticulatum* and var. *glaucum*, Haw. Obs. Mesemb., p. 150, 151 (1795), and N. E. Br. in Journ. Linn. Soc. Bot., vol. XLV, p. 80, t. 9, fig. 33.

C. difformis, N. E. Br.-- *Mesembryanthemum difforme*, Thunb. Prod., p. 90 (1800), N. E. Br. in *Bothalia*, vol. I, p. 153 (June 1923, wrongly dates 1922) not of Linne; and *M. exiguum*, N. E. Br. in Journ. Linn. Soc. Bot. vol. XLV, p. 102 (1920). As *M. difforme*, Thunb. and *M. difforme* Linne are now each referred to a different genus, both names may be retained, the former here, the latter being a species of *Glottiphyllum*. When in its resting condition *C. difformis*, as represented by the type specimen in Thunberg's herbarium, much resembles *C. cigaretifera* when also in its natural resting stage, but comes from a different locality, and is probably very distinct when in a flowering condition.

C. inconspicua, N. E. Br.-- Described and figured later.

C. inspersa, N. E. Br.-- *Mesembryanthemum inspersum*, N. E. Br., in Journ. Linn. Soc. Bot., vol. XLV, p. 81, t. 6, figs. 19, 20 (1920). In this species in spring all the basal or united part of the growths become of a rich and pleasing purple colour, in the same way that *C. purpurascens* does, but it is a more slender plant than the latter species.

C. lecta, N. E. Br.-- *Mesembryanthemum lectum*, N. E. Br., in Journ. Linn. Soc. Bot., vol. XLV, p. 82, t. 9, fig. 36 (1920).

C. Marlothii, N. E. Br.-- Described and figured later.

C. Meyeri, N. E. Br.-- Described and figured later.

C. parvula, N. E. Br.-- *Mesembryanthemum parvulum*, Schlechter in Engl. Bot. Jahrb., vol. XXVII, p. 129.

C. Pearsonii, N. E. Br.-- Described later.

C. peculiaris N. E. Br.-- Described and figured later.

C. pressa, N. E. Br.-- *Mesembryanthemum pressum*, N. E. Br. in Journ. Linn. Soc. Bot., vol. XLV, p. 82, t. 10, fig. 46 (1920).

C. purpurascens, N. E. Br.-- *Mesembryanthemum purpurascens*, Salm Dyck, Obs. Bot., p. 28 (1822), and N. E. Br. in Journ. Linn. Soc. Bot., vol. XLV, p. 82, t. 8, fig. 28. The basal part of this species becomes suffused with purple, as in *C. inspersa*, but is a much more robust species than the latter.

C. robusta, N. E. Br.-- *Mesembryanthemum robustum*, Haw. Misc.

C. Roodiae, N. E. Br.-- Described and figured later.

C. rostrata N. E. Br.-- Described and synonymy given later.

C. rostratoides, Haw. Obs. Mesemb., pl. 154 (1795), N. E. Br., in Journ. Linn. Soc. Bot., vol. XLV, p. 85, t. 7, fig. 27.-- *M. ramulosum*, Haw. Misc. Nat., p. 89 (1803).

C. tuberculata, N. E., Br. -- Described and synonymy given later.

C. ventricosa, N. E. Br.-- A doubtful species. Described and the synonymy given later. N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 79: 425. 1926.

(Continued from page 407.)

8.--CHEIRIDOPSIS, N. E. Br.

Descriptions.

425 *C. carnes*, N. E. Br. -- Tufted and stemless, up to 2 inches high when out of flower. Leaves one to two pairs to a growth, erect, their sheaths 4-9 lines long, their free part 9-15 lines long, and (when dried) $1\frac{1}{2}$ -2 lines broad and thick, of equal thickness throughout, flat above, keeled on the back, obtuse at the apex in side view, with a minute apiculus, glabrous, dotted along the edges and keel. Pedicel $1\frac{1}{4}$ - $3\frac{1}{2}$ inches long, 1 line or more thick, bractless, glabrous. Calyx 5-lobed, glabrous; ovary-part hemispherical, about 3 lines in diameter; lobes unequal, the two longer $3\frac{1}{2}$ lines long, leaf-like, the other three shorter, broadly ovate and with membranaceous margins. Corolla about an inch or rather more in diameter; petals 6-7 lines long "pink" Stamens numerous, erect, about 2 lines long. Stigmas 8, erect, 1 line long, subulate, apparently yellow. Fruit not seen.

Piquetberg Division: on a Kopje near Eende Kuil. Stephens and Glover 8733.

C. Caroli-Schmidtii, N. E. Br. (Fig. 216).-- Plant about $1\frac{1}{2}$ inch high, consisting of a number of crowded growths upon very short branches ($\frac{1}{4}$ -1 inch long) arising from a deeply descending rootstock, 4-6 lines thick. Each growths with 1-2 pairs a leaves $\frac{1}{2}$ - $1\frac{1}{2}$ inch long, 4-6 lines broad at the base, and 4-6 lines thick near the apex where the keel is slightly dilated, erect or spreading, shortly united at the base, flat and gradually tapering from base to apex above, keeled and much compressed on the back and obtusely rounded at the apex, in side view, entire, glaucous or whitish-green, conspicuously dotted. Flowers not seen, but represented in fig. 216. Pedicels of the fruit 3-9 lines long, with 2 small bracts at the base. Capsule closed 4-5 lines in diameter, hemispherical, flattish on the top, and when expanded 8-9 lines in diameter, with 10 valves and cells; valves about 2 inches long, very spreading or slightly reflexed, pallid; expanding keels contiguous for $\frac{2}{3}$ of

425 their length, diverging at the tips, with narrow, membranous wings, and awn-like tips, all of the same pallid ochreous colour as the valves; cells roofed with stiffish submembranous transparent cell-wings not rising to the level of the expanding-keels, and the opening nearly closed by a large, globose, white tubercle, which forms a nice contrast to the pale ochreous which colour of the pretty star-like capsule. Seeds $\frac{1}{3}$ line in diameter, globose-ovoid, smooth, pale brownish, with a brown nipple at one end.

Mesembryanthemum Caroli-Schmidtii, Dinter and Berger in Engler, Bot. Jahrb., vol. L. Suppl., p. 587 (1914).

Fig. 216 is from a photograph by Mr. T. N. Leslie, taken in South Africa, and represents the plant of natural size when growing under favourable conditions, but I have seen plants that have been sent direct from their native locality with leaves scarcely half the size of those in the figure, owing to drought in their native place.

Great Namaqualand: near Aus, Dinter, Rogers, Pole Evans, Phillips.

C. cigarettifera, N. E. Br. (Fig. 217) -- Perennial, tufted, about an inch high or rather more under cultivation, glabrous. In its natural resting state consisting of a tuft of withered, grey or brownish, cylindric, or cup-like sheaths, 4-5 lines long, truncate at the top, bearing two withered leaf-tips 2-3 lines long and enclosing a pair of erect, nearly free leaves, 5-7 lines long. Under cultivation the nearly free pair of leaves develop and become 8-20 lines long, $2\frac{1}{2}$ - $4\frac{1}{2}$ lines broad and $2-2\frac{1}{2}$ lines thick at the base, where they are very shortly united, slightly narrowing upwards, obtuse, minutely apiculate, flat above, very convex on the back at the lower part, obtusely keeled at the apical part and the keel at the apex minutely denticulate; surface smooth, dull light glaucous-green, dotted, with the margins and sometimes the keel marked with a line of dots. The next pair of leaves are united at the base for $\frac{2}{3}$ - $\frac{3}{4}$ of their length into an oblong-ovoid body 4-5 lines long, 4 lines broad and three lines thick, shortly 2-lobed at the top, the lobes being erect and like the free leaves in shape and colour, but smaller. From the centre of this body arises either a flower or, after a time a pair of nearly free leaves, and the body then withers to form a whitish or grey truncate, sleeve-like sheath. Pedicel 6-18 lines long, nearly 1 line thick, terete, light green, smooth, Calyx equally 5-lobed; ovary part hemispherical, about $1\frac{1}{2}$ line long and 3- $3\frac{1}{2}$ lines in diameter, green; lobes reflexed, 3 lines long, $1\frac{1}{2}$ - $1\frac{3}{4}$ line broad, oblong, obtuse, some with narrow membranous margins. Corolla 14-18 lines in diameter, expanding about midday even in dull, sunless weather, if the temperature is about 70° , but then the petals only spread out flat and are crowded, while in bright sunshine they are more lax and all recurved, or the two outer series are recurved and the inner series horizontal, 6-8 line long, $\frac{2}{3}$ - $\frac{3}{4}$ line broad, linear, obtuse, uniformly bright yellow, shining on the inner, dull on the outer surface. Stamens numerous, diffused and lax; filaments and anthers yellow, shining on the inner full on the outer surface. Stamens numerous, diffused and lax; filaments and anthers yellow. Stigmas 10, about 2 lines long, spreading, rather slender, plumose, white. Capsule about $3\frac{1}{2}$ - 4 lines in diameter, flattish on the top, with 10 valves and cells; valves with 2 diverging, expanding-keels, with their wings reduced to membranous awn-like points; cells roofed with membranous cell-wings and the opening nearly closed by a large tubercle.

Mesembryanthemum cigaretttiferum, Berger in Engler, Bot. Jahrb., vol. XLV, p.225 (1910). *M. vescum*, N. E. Br. in Journ. Linn. Soc. Bot., vol. XLV, p. 89, pl. 6, figs. 15-18 (1920).
Laingsburg Division: Near Matjesfontein, Austin, Brunthaler, Pillans.

Very few plants are so deceptive and so difficult to determine as this, for no one seeing it in its natural resting state would identify it as being the same as that I have figured under the name of *Mesembryanthemum vescum*, quoted above, yet the two are undoubtedly the same species.

From the imperfection of the original description of *M. cigaretttiferum* I was misled into supposing it to be the same as *M. pygmaeum*, Haw. But Mr. G. Schwantes, finding that I had made this mistake, very kindly sent to me a photograph of a cultivated plant of *M. cigaretttiferum*, which, however, differed so greatly from the description of that plant that at first I thought some mistake had been made in the name. At about the same time I received from a friend two plants in a resting condition collected near Matjesfontein and another of the same species from an unknown but different locality. These plants soon developed the tiny dormant leaves that were (when received) scarcely longer than the sheaths in which they were contained (see Fig. 217A), but grew out and became of the size above described (see Fig. 217B), and exactly as represented in Mr. Schwantes photograph of *M. cigaretttiferum*. As there were still some of the growths on the plants in the same dormant state as when received, I compared them with the original description of *M. cigaretttiferum* and found them to agree perfectly with it, so that Berger evidently described *M. cigaretttiferum* from an imported plant in its withered, resting condition, in which state the most conspicuous feature is the withered, grey, short, sleeve-like or cup-like truncate sheaths formed by the dead pairs of united leaves, each enclosing an undeveloped pair of nearly free leaves. Under cultivation this plant never appears to assume the same appearance as it does when at rest under natural conditions. Subsequent stages of the plant (as at Fig. 217C) demonstrated that it is identical with that I have described and figured under the name of *M. vescum*, from a plant sent to me by Mr. Pillans, from Matjesfontein. At Kew the same plant was cultivated, which was received from Matjesfontein from Mr. Brunthaler, so that it is probable that the Kew plants of *M. vescum* were even part of the original importation of *M. cigaretttiferum*, although I was not aware of it, and the plant as I saw it could not possibly be identified with the description of that species.

C. cuprea, N. E. Br.-- Leaves usually 2 pairs to a growth, up to 1½ inch long and 2 lines broad, each pair connate at the base, with the sheath up to 7 lines long, one ascending the other recurved, flat on the face, keeled on the back with convex sides, obtuse or subtruncate (probably in side view) and slightly serrulate at the apex, smooth. Peduncle 2½-3 inches long, terete, bibracteate at the base, bearing 1-3 flowers; bracts (probably really a pair of leaves) 10-12 lines long. Calyx depressed-crater-like, subequally 4-lobed; tube 2 lines long, constricted at the apex; lobes 4-5 lines long, two with membranous margins. Corolla 1½ inch in diameter, opening at midday; petals in many series, 6½-8½ lines long, linear-spathulate, acute, entire, coppery-red above the middle, paler below, golden yellow at the base, and rosy-purple on the back. Stamens erect, 1-2½ lines long; inner filaments bearded at the base,

426 yellow; anthers blackish; pollen whitish. Disk annular, crenulate. Stigmas 12, suberect, 2 lines long, lanceolate, acuminate.

Mesembryanthemum cupreum, L. Bolus in Ann. Bolus Herb., vol. III. p. 159 (1924).

Van Rhynsdorp Division: near Van Rhynsdorp, Watermeyer.

The above is translated from the original description given by Mrs. Bolus.

C. inconspicua, N. E. Br. (Fig. 218).-- Growths when at rest (the only state in which they have as yet been seen by me) $2\frac{1}{2}$ -4 inches high, formed of two erect or ascending leaves united at the base into a solid body 9-12 lines long, 7-10 lines broad and 6-8 lines thick, the free part 2-3 inches long, 6-8 lines broad and 5-6 lines thick at the base, the flat face gradually tapering from the base to an acute apex, obtusely keeled all down the back and the keel and edges quite entire, not at all scabrid or ciliate under a lens, in side view either subparallel for most of the length and becoming acute at the apex, or the keel of one leaf slightly dilated at the apex and less acute, surface smooth, glabrous, uniformly glaucous-green with a faint bluish tinge, opaque, not at all shinin, inconspicuously and thickly dotted all over with very small dots of a slightly darker green, easily seen iwth a lens, but very indistinct to the naked eyer. Flower not seen. Pedicel of the fruit $2\frac{1}{2}$ inches long, $1\frac{1}{2}$ line thick at the base and 24 lines thick at the apex, with a pair of small bracts at its very base. Capsule 9 lines in diameter when closed, flattish on the top, when expanded 15 lines in diameter, with 12-13 expanding valves and cells; valves reflexed, pallid; expanding-keels parallel at the basal half, then diverging, their tips ending in awn-like points which incurve and cross one another over the centre of the valve.

Van Rhynsdorp Division: Near Van Rhynsdorp, Mrs. E. Rood.

Although I have not seen the flowers of this species it is so distinct in its foliage and large capsule from all the others that are described or have been seen by me that I have no hesitation in describing it as new. There is no evidence of the somewhat pellucid margin or row of pellucid dots prevalent on most of the species along the edges and keel, no minute serrulation or scabridity on the apical part of the keel, and the dots seem to me more inconspicuous than they are on its allies, while the fruit is larger than that of any other species I have yet seen.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 80: 9. 1926)

(Continued from p. 425, Vol. LXXIX.)

8.--CHEIRIDOPSIS, N. E. Br.

- 9 *C. Marlothii*, N. E. Br. (Fig. 4).-- Plant as imported in its resting state about $1\frac{1}{2}$ inch high, stemless, of numerous growths in a clump. Each growth consisting of a cylindric white sheath enclosing a pair of leaves; the sheath is 8-10 lines long and $3-3\frac{1}{2}$ lines in diameter, shortly slit down on one side or on opposite sides at the top, and there bearing the withered remains of two short leaves, from the base of each of which a slender, acute ridge extends to the base, thin but rather rigid in consistence

9 and snow-white in colour, without dots or marks of any kind. The enclosed pair of leaves are slightly shorter than the sheath, and, being shrivelled, do not fill it tightly, their flat faces are pressed together so as to form a beak-like body about $3-3\frac{1}{2}$ lines broad and $1\frac{1}{4}$ line thick, like that common to many species of this genus; surface smooth, glabrous, apparently light green or glaucous green tinged with red at the apex and along the acute keels, and distinctly dotted with darker green all over. Flowers not seen. Pedicels of the fruit ascending or very spreading with the capsule upturned from it, 8-15 lines long, with the withered remains at its base of the short growth (the so-called bracts) from which it emerged, glabrous, white. Capsule, when closed, 4-5 lines in diameter and about 3 lines deep, circular in outline, flat with a raised centre at the top, convex beneath, with 9-10 valves and cells, white until wetted: when expanded about 7-8 lines in diameter, with the valves reflexed and S-shaped in side view; expanding keels about half as long as the valves, diverging from their base, ciliate-toothed along the edges, chestnut-brown with pallid, awn-like tips; cells convexly or bluntly roofed with stiff, translucent, pale brownish cell-wings turned back at the opening like the mouth of a trumpet and the opening completely closed by a large white tubercle, near the middle of the roof each pair of cell-wings rises into a pair of stiff erect awn-like points $\frac{3}{4}$ line long, concave on the inner side at the base. Seeds several in a cell, $\frac{1}{3}$ line long, compressed-ovoid, acute at one end, smooth, pale brown with the point darker brown.

Little Namaqualand: Locality unknown, Marloth.

In its natural resting condition this is one of the most remarkable and most distinct species in this curious genus that I have seen, and I have great pleasure in associating the name of Dr. R. Marloth (who kindly sent it to me) with such an interesting plant. The snow-white unspotted sheaths are remarkably sleeve-like in appearance, well conforming to the generic name, and are very remarkable structures, and as only just the tips of the leaves contained in them are visible, even when viewed from above, if the plant grows among white stones it would scarcely be perceived at a distance of a few feet away when in a resting condition.

Although the above description gives no account of the plant in a growing or flowering condition, I publish it because its appearance in the natural resting condition and the structure of the fruit is so unlike that of any other known species that there can be no possibility of mistaking it when seen in its resting and fruiting state, and the vegetative characters will be given later. I believe, however, that the strange appearance of this plant in its natural resting condition will never be repeated in this country, on account of the greater humidity of our climate.

The structure of the fruit, too, presents an unsolved problem as indeed does that of the whole genus; for the capsules of all the species are fashioned on the same plan, but the tubercle in this species appears to me to more completely close the opening than in other forms of species, so that I cannot understand how the seeds can escape from the cells; roofed as they are by stiff cell-wings, it would seem almost impossible for them to do so. Whether the curious pair of awn-like points arising from the roof formed by the cell-wings have anything to do with the dispersal of the seeds I cannot say, but I suspect that they aid dispersal in some way, for such an elaborate structure as that of the fruit of this plant and its allies almost certain to have some connection with the dispersal and future welfare of the seeds, which certainly do get out

9 of the capsules, as is testified by the completely or partially empty cells I find in many of the capsules, indeed, in almost all those that show evidence of having once opened on the various species I have examined.

C. Meyeri, N. E. Br. (Fig. 5).-- Plant scarcely an inch high as imported, tufted or forming small clumps. Growths when at rest more or less crowded, each consisting of an orbicular or obicircularly obovate, erect body, 4-6 lines long, $3\frac{1}{2}$ -5 lines broad and $1\frac{1}{2}$ -2-lines thick, with acute edges and appearing quite entire without visible orifice or fissure, and covered with a white skin having a slight acute ridge down the centre of the apical part on each side (Fig. 6A). When vegetative activity is resumed, the skin bursts, a new growth appears (Fig. 6 B and C), formed of a pair of opposite leaves united at their base, 5-6 lines long, 2-2 $\frac{1}{2}$ lines broad and $1\frac{3}{4}$ -2 lines thick at the base, dilating to 3-3 $\frac{1}{2}$ lines thick at the upper part, flat on the face and there tapering gradually from the base to a subacute apex, keeled all down the back, not apiculate, entire; surface smooth, glabrous except at the microscopically ciliate edges, green or brownish, inconspicuously (not so distinctly as shown in the figure), and somewhat thinly dotted with darker green, and the dots pellucid when viewed against the light. Succeeding this pair of leaves is a second pair united for most of their length into a solid, ellipsoid body 4-5 lines long, 3 lines broad and 2 $\frac{1}{2}$ lines thick, keeled over the top and slightly and abruptly compressed at the apex as it pinched there between the finger and thumb (Fig. 6 D), coloured like the other leaves, not at all glaucous. At its base two similar but smaller bodies afterwards develop. All these bodies ultimately pass to rest and become as shown in Fig. 6A. Flowers not seen. Pedicels of the fruit solitary, terminal 4-7 lines long, ascending or spreading horizontally with the capsule abruptly upturned, each with the withered skin of a pair of leaves or bracts at its base, glabrous. Capsule when closed 4-5 lines in diameter, 2 lines deep, flattened above and beneath, circular in outline, glabrous, white or pale brown, with 10-11 valves and cells; when expanded 7-8 lines in diameter; valves about 2 lines long and $1\frac{1}{4}$ line broad, pallid, with orange-brown expanding-keels, contiguous at the basal part and diverging above, toothed along the edges, with awnlike points; cells acutely roofed with stiff, pale brown cell-wings that are raised into a hump towards the centre of the capsule, and the opening nearly closed by a large white tubercle. Seeds many in each cell, less than $\frac{1}{2}$ - inch long, ovoid, acute at one end, smooth, light brown.

Little Namaqualand: Near Steinkopf, Meyer, Marloth 6592.

This very distinct and remarkable species is quite unlike any other known to me. Living plants of it have been sent to me by Dr. R. Marloth, who informs me that it was discovered by the Rev. G. Meyer, after whom I have named it.

Seen only in the resting state very few would associate this curious plant with *C. rostrata*, *C. bifida* and similar plants placed under this genus, for when in its withered whitish skins it might be mistaken for some much compressed member of the genus *Conophytum*; the structure of its capsule, however, at once proclaims it to be a species of *Cheiridopsis*, and a view of the new growths that burst through the white sheaths at once remove all doubt as to its affinity. In having a sheath entirely closing the new growth it shows some alliance with *C. peculiaris*, N. E. Br.

The hump on the roof of the cells formed by the cellwings is

9 evidently a more rudimentary development of the erect, awn-like points on the roof of the cells of the capsule of *C. Marlothii*.

Fig. 5 is from a photograph of an imported plant in a resting condition, about three-fourths natural size, which has been kindly sent to me by Mr. Franz de Laet.

N. E. Brown.

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 80: 35. 1926.

(Continued from page 9.)

8.--CHEIRIDOPSIS, N. E. Br.

35 *C. Pearsoni*, N. E. Br.-- Stemless, tufted, $1\frac{1}{2}$ -2 inches high including the flowers. Leaves 1-2 pairs to a growth, the sheath part 3-6 lines long and their free part (in the dried specimen) 8-15 lines long, and $1\frac{1}{2}$ -2 $\frac{1}{2}$ lines broad and thick, flat above, keeled on the back, of nearly equal thickness throughout, acute or rounded into an acute apex in side view, glabrous, dotted all over on the sides. Pedicel 6-9 lines long, scarcely 1 line thick, bractless, glabrous. Calyx 5-lobed, glabrous; ovary-part hemispherical, $3\frac{1}{2}$ -4 lines in diameter; lobes $1\frac{1}{2}$ -2 $\frac{1}{2}$ lines long, all broadly ovate, obtuse or acute, three of them with membranous margins. Corolla about $1\frac{1}{2}$ inch in diameter, petals numerous, 6-7 lines long, linear, light yellow or yellowish with a pinkish tinge. Stamens numerous, erect, about 2 lines long, apparently yellow. Stigma 7-8, about 1 line long, subulate, united at the base into a slight cup. Fruit not seen.

Little Namaqualand: Khamiesberg region, growing in wet sand in Naras Ravine, Pearson 6345, and in damp grown at Bailey's Vlekke, Pearson 6440.

This has been distributed as being *Mesembryanthemum robustum*, Haw., but that is a very different and much stouter plant.

C. peculiaris, N. E. Br. (Figs. 20, 21, 22, and 23).-- Stemless, forming with age clumps of several growths (7 on the only plant seen). Root of old plants about $3\frac{1}{2}$ -7 lines thick, descending deeply into the ground. Each growth, as seen on a newly imported plant in a state of rest (Fig. 20) consisting of two erect leaves, free nearly to their base, with their flat faces closely applied to one another, forming a compressed, orbicular-ovate body 10-15 lines long, about the same in breadth and 5-8 lines thick, enclosed in a semi-transparent skin (the dried sheath of a previous pair of leaves) of a somewhat parchment-like texture; these leaves are flat on their applied surfaces, convex and faintly keeled at the back, rounded at the apex, with a minute apiculus, glabrous, pale, greyish-green or sub-glaucous-green, with or without a purplish tint, and indistinctly dotted with darker green.

Under cultivation in England, when rooted, the two leaves of each growth separate and spread out flat. Between them arises a pair of shorter leaves united for half or more than half of their length, with their short tips ascending or spreading, deltoid-ovate, subacute, flat above, keeled on the back. These were succeeded by a much larger pair $1\frac{1}{2}$ -2 $\frac{1}{2}$ inch long, united for half their length into a sub-cylindric body 8-9 lines thick, with the free tips ascending-spreading, deltoid, subacute, flat above, keeled on

35 the back. After a period of rest these were followed by a pair of elongated-deltoid acute leaves 1 $\frac{1}{2}$ -2 inches long, 6-8 lines broad, and 3-4 lines thick (nearly as in Fig. 21), free nearly to the base, flat on the face and keeled on the back, having their basal part enclosed in the skin formed by the withered sheath of the preceding pair. This third pair probably corresponds in sequence with the sub-orbicular pair upon the imported plant. If kept watered, the plant grows as represented at Fig. 21 but if given dry treatment and allowed to rest, it assumes the forms represented in Figs. 22 and 23.

All the leaves are smooth, glabrous, sub-glaucous-green, or greyish-green, more or less tinted with purple when exposed to full sunlight, dotted (chiefly on the back) with darker green. Flowers solitary, terminal. Pedicels 2 $\frac{1}{4}$ -2 $\frac{1}{2}$ inches long and about 1 $\frac{1}{2}$ line thick, terete, smooth, glabrous, green, arising from between a pair of leaves similar to those of the resting stage but united for only about half their length. Calyx unequally 5-lobed; lobes spreading, two of them 7-8 lines long and the other three 5-6 lines long, linear-lanceolate or deltoid-lanceolate, from an ovate base 3 $\frac{1}{2}$ -4 lines broad, acute, keeled on the back, smooth and glabrous, the saucer-shaped ovary-part 6 $\frac{1}{2}$ lines in diameter and 2 $\frac{1}{2}$ lines deep, and other with the base of the lobes green, the upper part of the lobes dull slaty-purple. Corolla 2 inches in diameter, opening in the morning and closing at sunset, or earlier if the temperature is insufficient, and lasting for about two weeks. Petals numerous, in 4 or 5 loosely imbricating series, 9-10 lines long, $\frac{1}{2}$ - $\frac{3}{4}$ line broad, linear, obtuse, clear yellow, not shining. Stamens very numerous, surrounded by about one series of filiform staminodes; for the first nine or ten days all are connivent in a cone and conceal the stigmas, afterwards separating and standing erect around the stigmas, 3-5 lines long, the inner being much shorter than the outer; staminodes and filaments (which are bearded at the base) yellow like the petals; anthers somewhat orange-yellow. Stigmas 14-15, about 1 $\frac{1}{2}$ line long and shorter than the stamens, subulate, plumose, acute, pale yellowish connivent until the pollen is shed, then ascending-spreading with recurved tips, but very crowded. Ovary partly superior, very convex on the top, with 14-15 cells. Capsule, when closed, 6-8 lines in diameter and 3-4 lines in depth, flattened on the top, with about 14-15 valves and cells, light brown; when expanded and the valves reflexed 9-11 lines in diameter; valves about 7 lines long and 1 line broad at the base, somewhat hatchet-shaped at the apex in side view, pallid; expanding-keels contiguous at the base, diverging above, toothed along the edges, dark brown, ending in linear, sub-membranous, paler points extending nearly to the tips of the valves, upcurved and obliquely truncate at their tips, and with rather narrow membranous, brownish, marginal wings at the basal half; cells very acutely roofed with rather stiff, light brownish cell-wings turned back at the opening like the mouth of a trumpet, and the opening nearly closed by a large pallid tubercle. Seeds $\frac{1}{2}$ line long, ovoid, smooth, brown.

Namaqualand: Locality and collector unknown.

I received an old plant of this remarkable species early in 1920 from Mrs. Doree of Ilford, a few plants having been sent to her husband from South Africa, but arriving after his death. A photograph of this plant taken by my daughter is represented by Fig. 20. Fig. 21 is from a photograph of the plant as cultivated at Edinburgh Botanic Garden, kindly sent to me by its Regius Keeper, Professor W. W. Smith; and Figs. 22 and 23, represent the plant

35 slightly more than natural size, as cultivated at Seven Kings by Mr. D. O'Donoghue, to whom I am indebted for the photographs. The three plants represented by these figures were all identical in appearance when first imported, but the different conditions under which they have been cultivated has had a very marked effect upon their development, and had not their history after importation been accurately known, it would be difficult to credit that all these figures represented but one species.

Mr. O'Donoghue informs me that with him "it seems to flower freely," and to him I am also indebted for the fruit of this plant. The flower from which my description was made was sent to me by Mr. T. M. Endean, of Laindon, Essex.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 80: 72. 1926.

(Continued from page 35.)

8.--CHEIRIDOPSIS, N. E. Br.

72 C. Roodiae, N. E. Br. (Figs. 44 and 45).-- Growths of newly imported plants borne on short, branching, moderately stout stems, densely clothed with the remains of old brown sheaths; each growth on the plant seen with 2-3 pairs of leaves, the lower pair of diverging, united at the base into a body or sheath 6-8 lines long, 6 to 10 lines broad and 5-7 lines thick, with the free part $1\frac{1}{2}$ -2 inches long, 5-6 lines broad and $4-5\frac{1}{2}$ lines thick at the base, flat on the face, and there gradually tapering from the base to a subacute apex, obtusely or subacutely keeled all down the back; the second pair of leaves are very much more slender, erect, and closed together in the form of a linear beak, $1\frac{1}{2}$ -2 inches long, 3-4 lines broad and $1\frac{1}{2}$ -2 lines thick, somewhat obtuse in side view, but each leaf composing the "beak" minutely apiculate at the apex, and with a subpellucid keel; surface of both pairs of leaves smooth, glabrous, pale glaucous-green or whitish green, with continuous subpellucid edges and keel when viewed against a strong light; not visibly dotted, even under a lens, unless viewed against a strong light, when a rather scanty sprinkling of pellucid dots are visible. Flowers and fruit unknown.

Van. Rhynsdorp Division: Locality unknown. Mrs. E. Rood.

I received this plant from Mrs. Rood without information as to its origin, and have much pleasure in naming it after her.

It is well distinguished from all other species by its sturdy habit and the absence of dots from its leaves as viewed in ordinary light.

C. rostrata, N. E. Br.-- Growths with 1-3 pairs of leaves, $2-3\frac{1}{2}$ inches long, the lower or primary pair stouter than the others and spreading, 6-8 lines broad and 4-5 lines thick at the base where they are united into a sheath about six lines long and 8-9 lines thick, flat on the face which tapers from the base to an acute apex, rounded on the back at the basal part, keeled above, in side view abruptly rounded in from the keel to the minutely apiculate apex; the next pair to are much more slender and much more pointed in side view, and at the base are united into a sheath, 9-10 lines long embracing the third pair, which have their flat faces

72 closely pressed together so that they somewhat resemble a bird's beak; this pair are of the same form as the primary pair, and a primary pair in their turn.: surface of all smooth, glabrous, except at the very minutely ciliate edges and keel, glaucous-green, dotted with dark green on the back and along the margins and keel, glaucous-green, dotted with dark green on the back and along the margins and keel, but not on the flat face, and on the stouter leaves the dotting is often chiefly at the apical part; the keel at the apex of the stouter leaves is somewhat pellucid and slightly rough. Pedicel 2-2½ inches long, erect, terete, green. Calyx unequally 4-lobed; the two longer lobes 8-12 lines long, leafy. Corolla about 1½ inch in diameter, opening before midday and closing between 4 and 5 p.m., lasting about two weeks; petals numerous, clear yellow. Stamens numerous, erect, white? longer Stigmas 8, about 2 lines long and finally longer than the stamens, connivent until the petals fade, then ascending-spreading, plumose.

Mesembryanthemum rostratum, Linn. Sp. Pl., ed. 1, p. 486 (1753) and N. E. Br. in Journ. Linn. Soc. Bot., vol. XLV, p. 85, t. 8, Figs. 29031, and t. 9, Fig. 32 (as *M. quadrifidum*), not of other authors. *M. quadrifidum*, Haw. Misc. Nat., p. 28 (1803), Synop. Pl. Succ., p. 212, and Rev. Pl. Succ., p. 91: Ait. Hort. Kew., ed. 2, vol. III, p. 216; Sonder in Fl. Cap. vol. II, p. 394; and Berger, Mesemb. p. 257. *M. rostrum ardeae referens*, Dillen. Hort. Elth., p. 240, t. 186, f. 229 (1732).

South Africa: Locality and collector unknown.

This plant has been long in cultivation, but is often confused with *C. tuberculata*, which is similar in appearance, but more slender in its growths and has its leaves more conspicuously dotted all over, with the dots usually slightly prominent, which they are not in *C. rostrata*.

I have only seen one partly withered flower of this species, kindly sent to me by Mr. T. M. Endean, of Laindon, from which I have made the above description. As in the case of those of *C. tuberculata*, the stigmas are at first all closely pressed together into a spire-like column, only separating and spreading after the flower has been open some days and the petals begin to wither.

C. tuberculata, N. E. Br.-- Growths with 1-3 pairs of leaves, in general character resembling those of *C. rostrata*, but longer, more slender, and more acute in side view, being 2½-4½ lines long, 4-5 lines broad and 2p-3p lines thick at the base, where the outer pair are united for about half-an-inch, and the second pair for 1-½ inch; surface usually with slightly prominent dots, minutely ciliate on the edges and keel, otherwise glabrous, glaucous-green, dotted with dark green all over or less conspicuously on the flat face. Pedicel 3-4 inches long and 1½ line thick, erect, terete, green. Calyx unequally 4-5-lobed; ovary-part hemispherical; the two long lobes 4-14 lines long, leaf-like, reflexed or reflexed-spreading, the others 2-4 lines long, broadly ovate, obtuse, membranous or with short, dorsal, leaf-like tips. Corolla 1½ inch in diameter, expanding before noon and closing between 5 and 6 p.m., or earlier if the temperature is not sufficient, and lasting about two weeks; petals in about 3 series, 6-8 lines long and 1/3-½ line broad, linear, subacute, recurved-spreading and loosely overlapping, light clear yellow, shining. Stamens numerous, at first connivent, afterwards erect, unequal in length, the longer 3½-4 lines long, filaments pale yellowish, the inner series bearded at the base; anthers yellow, becoming whitish. Gland all united into a narrow

73 crenulate ring, dark green. Stigmas 8-10, as long as or slightly overtopping the stamens, 2-2½ lines long, at first closely pressed together into a tapering column, but when the pollen is shed and the petals begin to wither they separate and are slightly spreading with recurved acute tips, plumose, pale yellowish. Ovary half-superior, very convex on the top, with 8-10 cells, green.

Mesembryanthemum tuberculatum, Miller, Gard. Dict., ed. 8, No. 32; and N. E. Br. in Journ. Linn. Soc. Bot., vol. XLV, p. 87, t. 6, Figs. 12-13 (1920). *M. rostratum*, Salm Dyck, Mesemb. 3, fig. 7, and Berger; Mesemb., p. 256, fig. 55, I-III, not of Linne.

South Africa: Locality and collector unknown.

This species is commonly cultivated under the name of *Mesembryanthemum rostratum*, for which it was mistaken by Salm Dyck and subsequent authors. But it is readily distinguished from the true *C. rostrata* by its much more slender leaves, that are more conspicuously dotted all over, and particularly by the dots being more or less prominent on some of the leaves, from which character Miller gave it to the name of *M. tuberculatum*.

C. ventricosa N. E. Br.-- Plant forming clumps with branches 5-18 lines long arising from the top of a firm rootstock. Each branch bearing a single growth with 1-2 pairs of leaves, and often with branchlets in the axils of the outer pair, and clothed at the base with 3-4 large, dry, chestnut-brown sheath 6-9 lines long and 7-10 lines in diameter, the remains of previous growths. Outer leaves ascending or spreading and the inner pair erect with their flat faces closed together for a period; 1½-3 lines long, 6-7 lines broad and 5-6 lines thick at the basal part, where they are united into a sheath 5-9 lines long, flat or very slightly convex above, obtusely keeled on the back, gradually tapering from the base to an acute or subacute apex: surface somewhat harshly velvety to the touch, being densely covered with microscopic points visible under a lens, glaucous-green or whitish-green. Peduncles 9-24 lines long, 1-flowered, bracteate at the middle. Bracts with the free part 6-10 lines long, united below into a ventricose or swollen sheath, harshly velvety like the leaves. Calyx unequally 5-lobed; lobes 6-9 lines long, linear-lanceolate, acute or apiculate, three of them with narrow, membranous margins. Petals in 3-4 series, 7-12 lines long, 1-2 lines broad, spathulate and acute or linear-spathulate and acuminate, rosy-purple, striped with purple towards the base. Stamens subdiffuse or the inner incurved, 2½-5 lines long, filaments not bearded, rosy; anthers yellow. Disk annular, crenulate. Stigmas 4-6, about 1½ line long, broadly subulate, abruptly apiculate-acuminate. Ovary convex at the top. Capsule when closed 4½-6 lines in diameter, shortly and broadly obconic, flattish and with 4-6 ridges about 1½ line high on the top, glabrous, hard and rigid, greyish, with 4-6 valves and cells: when expanded 8-9 lines in diameter; valves about 2-2½ lines long and 3-3½ lines broad, broadly deltoid, spreading horizontally, with the expanding-keels much shorter than the valve, widely separated throughout their length, being ½ line apart at the base, thence diverging, straight, acute, without membranous wings, chestnut-brown; cells acutely roofed with rather stiff brown cell-wings, and with a large whitish tubercle nearly closing the opening. Seeds not numerous in each cell, rather large, about ¾ line long, compressed, ovoid, with a point at one end, smooth, light brown.

Mesembryanthemum ventricosum, L. Bolus in Ann. Bolus Herb. vol. III, p. 128 (Sept. 1922).

Clanwilliam Division: near Clanwilliam, Fillans 1595. Van

The above description is compiled partly from a living plant and partly from Mrs. Bolus' description, for I have not seen flowers of it. Mrs. Bolus states "About April growth is resumed and by June the leaves are full-grown and have split the encasing sheaths of the previous year's leaves apart."

This species is described by Mrs. Bolus as "glaberrimum" very glabrous, I do not find it so, however, but covered with a minute pubescence of stiff, soft points, not distinct hairs.

I place this plant under the genus *Cheiridopsis* with very considerable doubt as to whether it should really be placed here, for although the vegetative characters are like those of *Cheiridopsis* the capsule is harder, with only 4-6 valves and cells, has very much deeper ridges on the top of it, and has quite a different appearance from that of any other species of *Cheiridopsis* I have seen. When its flowers can be properly compared with those of various species of *Cheiridopsis* possibly other differences may be found and a fresh genus made for its reception.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 80: 89. 1926)

(Continued from page 73.)

9. PLEISOPHILOS, N. E. Br.

89

Very dwarf, stemless, succulent perennials; leaves opposite, normally 2 (or when making a new pair 4) to each plant or growth, equal, ovate, very stout and thick, as broad as long, or less than twice as long as broad; firm, grey-green or brownish, conspicuously dotted. Flowers solitary 2-4 to a growth, terminal between the leaves, sessile, bracteate. Calyx 5-6-lobed nearly or quite down to its union with the ovary. Petals numerous, free, linear, arising around the margins of the top of the ovary. Stamens numerous, erect. Stigma 9-14, filiform; no style. Ovary inferior, 9-14-celled; placentas down the centre of the outer wall of the cells and extending a short distance up the central axis. Capsule subhemispheric, with 9-14 valves and cells; valves reflexed when wetted, each with a pair of parallel, expanding keels adnate up to the middle of the valve, then free, and the free part bearing a triangular, membranous wing, these wings unite with the wings of adjacent valves in pairs or become free and stand erect between the valves; cells acutely roofed by the rather rigid cell-wings or separated elements of the cell partitions, turned back at the opening and somewhat resembling the mouth of a trumpet, so that the whole series of roofs are raised into a sort of crown-like structure above the level of the expanding-keels, without tubercles at the mouths of the cells. Seeds compressed-ovoid with a nipple at one end, microscopically tuberculated, dark brown.

Species 2, natives of the eastern Karoo Region of South Africa. The type of the genus is *P. Bolusii*, N. E. Br.

The name is derived from the Greek, *pleios*, full, and *spilos*, a dot or spot, in allusion to the conspicuously dotted leaves. Owing to a shaky hand from old age, my diagram of the structure of this genus (as well as of other genera) is not very good, but is sufficiently correct in detail to show--in conjunction with that of the

KEY TO THE SPECIES.

Flat surface of the leaves not longer than broad and not acute at the apex, and the apical part of the leaves often an inch or more thick. 1. *Bolusii*

Flat surface of the leaves longer than broad and acute at the apex, and the apical part of the leaves usually less than an inch thick. 2. *simulans*.

1. *P. Bolusii*, N. E. Br. (Figs. 50, 51).-- Leaves slightly spreading, with their flat faces 1-2 inches long and as much or more in breadth, very broadly ovate in outline, obtusely pointed, the apical part of the leaves 1-2 inches thick, half-egg-shaped at that part in transverse section; surface slightly uneven from slight irregular bumps and depressions, glabrous, grey-green, often tinted brownish, thickly covered everywhere with conspicuous dark green dots. Flowers sessile, terminal, solitary or 2-3 together, bracteate. Calyx 5-6-lobed; lobes about 5 lines long, ovate, obtuse. Corolla 2 inches or more in diameter, expanding in the afternoon and closing in the evening for several days in succession; strongly scented, something like Cocoonut; petals 9-10 lines long, $\frac{1}{2}$ - $\frac{3}{4}$ line broad, cuneately linear, obtuse, bright yellow fading to white at base, paler on the back. Stamens very numerous, erect; filaments whitish, anthers deep yellow. Stigmas 9-11, ascending, finally rather longer than the stamens, seated on a stout conically-cylindric projection from the top of the ovary, which is 9-11-celled. Placentation and capsule as described for the genus.

Mesembryanthemum Bolusii, Hook. f. in Bot. Mag., t. 6664 (1882); Dyer in Ann. of Bot., v. XX, p. 125, t. 8; Marloth Fl. of S. Afr., v. 1, p. 206, t. 51; Berger Mesemb. n. 275, f. 60, 61, and in Monatsschr. f. Kakt. v. IX, p. 39, with fig.; Zeitschr. f. Sukkul., vol. II, p. 159; Rehnelt in Gartenwelt, v. XI, p. 302, with fig.

Graaff Reinet Division: Near Graaff Reinet, Bolus, near Kendrew, Frith, Aberdeen Division: Near Aberdeen Road, Marloth.

2. *P. simulans*, N. E. Br. Leaves widely spreading, 2-3 inches long, $1\frac{1}{2}$ -2 $\frac{1}{2}$ inches broad and $\frac{1}{4}$ - $\frac{1}{2}$ (rarely up to 1) inch thick near the apex, ovate, acute, flat on the face, compressed-keeled on the back at the apical part; surface smooth, glabrous, grey-green or more or less tinted with brownish, thickly covered everywhere with dark green or dusky dots, the young leaves slightly glaucous. Flowers solitary or 2-3 together, terminal, sessile or nearly so, bracteate. Bracts $\frac{1}{4}$ - $\frac{1}{2}$ inch long, ovate, acute, keeled, glaucous. Calyx 5-6-lobed; lobes 5-6 lines long and 5-5 lines broad, ovate or ovate-obanceolate, subacute or obtuse, the inner with membranous margins, glaucous-green with a slight reddish or purplish tinge, dotted with dark green. Corolla at first $1\frac{1}{2}$ -2 $\frac{1}{2}$ inches in diameter, enlarging day by day to 2 $\frac{1}{2}$ -3 inches in diameter, opening between 3 and 4 p.m., and closing between 6 and 7 p.m., irrespective of sunshine or closed if the temperature is not below 70° Fahr., lasting 10-12 days, strongly scented, somewhat like Cocoonut;

89 petals very numerous (over 150), in 4-5-series, spreading in different planes, the outer recurved, 9-13 lines long, 1-4 line broad, linear, acute or obtuse, entirely bright yellow or with the basal part white on the inner surface, whitish or pale pinkish on the back, scarcely shining. Stamens very numerous; filaments white; anthers orange-yellow. Stigmas 10-12, as long as or longer than the stamens, filiform, yellow, at first erect and closely placed in a bundle, afterwards separating, spreading and more or less curled at the tips.

Mesembryanthemum simulans, Marloth in Frans. S. Afr. Phil. Soc., 1907, v. XVIII, p. 43, t. 5, f. 7, and Fl. of S. afr. v. I, p. 206, f. 94; Berger, *Mesemb.* p. 278, f. 62; N. E. Br. in The Gardeners' Chronicle, 1921, v. LXX, p. 223, f. 94; Zeitschr. f. Sukkul. v. II, p. 156, with fig.

Aberdeen Division: Near Aberdeen Road, Marloth, Frith.

The Above two species, when growing under natural conditions, are said to closely simulate the stones they grow among, so that when out of flower may easily be overlooked at a little distance away from the, but when in bloom their large, bright yellow flowers would render them very conspicuous. Yet, in spite of this simulation of their surroundings, I am informed by Dr. Marloth and others that these plants are searched for and eaten by goats and other animals, and in some parts are becoming gradually exterminated by them.

The flowers of both species expand very regularly between 3.30 and 4 p.m., and close between 6 and 6.30 p.m., at the end of August or beginning of September, or sometimes later in the year, according to the nature of the summer and the watering they have received. Their flowers expand independently of sunshine, as I find that they will open in dull, sunless weather if the temperature is sufficient and not much below 70° Fahr. They are strongly and pleasantly scented with an odour that reminds one of that of the fluid in a Coconut. And., like the flowers of other genero of this groups of plants, they enlarge considerably while maturing their stamens and stigmas, the final diameter of the flower being usually about an inch larger than that of its first day of opening. During the first 4 or 5 days the stigmas remain closed together in column, but elongate during this period; meanwhile the anthers shed their pollen, and then the stigmas separate and become receptive.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 80: 149. 1926.
(Continued. from page 89.)

10.--DIDYMAOTUS, N. E. Br.

149

Succulent stemless perennial, very dwarf, Leaves opposite, 2 or when making a new growth 4 to each plant, those of each pair equal in size, hort, broad and very thick, ovate, not dotted. Flowers lateral, one on each side of the plant from the axils of the old leaves, bracteate. Calyx- 6-lobed down to its union with the ovary. Petals numerous, in about 3 series, free, linear. Stamens numerous, erect, not collected. Stigmas 6, subulate, acute, lacerate or plumose on the inner surface, erect; style

149 none. Ovary partly superior or shortly conical at the top, shallow, convex beneath, 6-celled; placentas on the floor of the cells. Capsule slightly convex, with 6 gaping ridges on the top, flattish beneath, with 6 valves and cells; valves with rather distant and slightly diverging expanding-keels and broad, membranous, acute, marginal wings; cells imperfectly roofed with gaping, membranous flexible cell-wings, no tubercle at the opening. Seeds very numerous in each cell, minute, globose-ovoid, with a nipple at one end, smooth.

Species 1, native of Ceres Division in South Africa.

The name is derived from the Greek, didymos, twin, and aotos, a flower, in allusion to the pair of flowers, one borne on each side of the plant.

D. lapidiformis, N. E. Br. (Fig. 73, 74, 75).-- Plant about $1\frac{1}{2}$ inch high, stemless. Leaves normally two to a plant or four when making a new growth, opposite, united at the base, up to about 1 inch long, $1\frac{1}{2}$ inch broad and $\frac{1}{4}$ - $\frac{1}{2}$ inch thick, with the flat face broadly rhomboid-ovate in outline, shortly and rather abruptly acute, strongly keeled on the back, smooth, glabrous, grey-green, reddish-brown, or purplish tinted, and covered with a glaucous film, not dotted; when the plant is at rest the leaves are more or less closed together. Peduncles lateral, one on each side of the plant, produced from the axils of the old pair of leaves; very short, bearing at first a much compressed obcordate or shortly 2-lobed or notched fleshy body keeled down each side, formed by a pair of stout bracts fused together for most of their length; from this body the flower arises after the resting period is over and the plant begins to develop a new pair of leaves. Pedicel about 6-10 lines long, $1\frac{1}{2}$ line thick, terete, smooth, glabrous, green. Calyx subequally 6-lobed, glabrous, ovary-part shallow, convex beneath; lobes $3\frac{1}{2}$ -6 lines long, $2\frac{1}{2}$ - $3\frac{1}{2}$ lines broad, deltoid-ovate or ovate-oblong, obtuse, spreading. Corolla about $1\frac{1}{2}$ inch in diameter, opening about 3 p.m.; petals numerous, in about 3 series, free, $4\frac{1}{2}$ - $7\frac{1}{2}$ lines long and about $\frac{1}{3}$ line broad, cuneately linear, obtuse or subacute, white or white tinted with rose. Stamens erectly spreading, not collected into a bundle; filaments bearded at the base, dark rosy; anthers yellowish-white. Stigmas 6, erect, with recurved tips, stoutly subulate, tapering to a fine acute point and plumose or lacerate on the inner face; style none. Ovary conical and 6-grooved on the top, shallow, 6-celled. Capsule 5-7 lines in diameter, slightly convex and with 6 gaping ridges on the top formed by the separated uptruned edges of the 6 valves, flattish beneath; valves about 2 lines long and $2\frac{1}{2}$ lines broad, deltoid, pallid within; expanding-keels orange-brown, rather distant and slightly diverging, with rather broad, membranous, pallid wings about as long as the valve and ending in acute points. Cells imperfectly and flatly roofed with gaping, membranous, flexible, pallid cell-wings that easily permit the seeds to escape. Seeds 200 or more (counted) in each cell, about 2-line long, obliquely pear-shaped, smooth, pale brownish, with a darker nipple.

Mesembryanthemum epidiforme, Marloth in Trans. Roy. Soc. S. Afr., vol. IV., p. 137 and 138, with fig.

Ceres Division: Ceres Karoo, Marloth.

This interesting plant in general appearance has much the habit of *Pleiospilos Bolusii*, and would seem allied to that genus, but the structure of its flowers (Fig. 73) and fruit is altogether different, and its mode of producing its flowers (one on each side

149 of the plant) is quite distinct from that of any other member of this large group of plants known to me.

D. lapidiformis seems to be a difficult plant to cultivate. Dr. Marloth informs me that he discovered it in the Ceres Karoo "about 50 miles from the nearest railway station," and as it resembles the stones it grows among it is not very easy to find when out of flower, for he states at the place above quoted, "In nature, the leaves are of a brownish-red colour and closely resemble the angular pieces of brown shale and sandstone between which the plants grow. As they are half buried in the ground they can be detected only with difficulty, even in localities where their occurrence is known." The plant flowers in the South African spring (September and October), and at the beginning of summer "the old leaves have shrivelled up, the new pair and has assumed the colour of the surrounding stones, and the plant remains dormant until the winter brings rain again." As the rainfall of the region it inhabits is said to be only three or four inches per annum I suspect that our moister climate does not suit it very well.

Dr. Marloth sent to me two plants of it, a dead flower and a ripe fruit. The plants lived about twenty month, each produced a fresh pair of leaves, and one of them a pair of dormant, flowering peduncles, before they died. I raise a number of seedlings, but they have gradually all died except one out of a number I gave to Kew Gardens, and Dr. Marloth informs me that his stock of the plant (collected at the same time as those he sent to me) grown at Cape Town have also all died. So that it is evident that it is not an easy plant to cultivate, even in its own country, away from its native habitat. The plant quickly dies if given too much water.

The manner in which the young flower-buds remain hidden in the body of the bracts, dormant and utterly invisible for months, is very remarkable. It is only when the plant is producing a new pair of leaves and a new pair of flowering peduncles for the next season that the flowers hidden in the old bracts make their appearance. I do not recall to mind a similar manner of flowering and in any other genera of this or any other Natural Order of Plants. In Fig. 74, the flower-buds are seen to be just emerging from the base of the notch in the bract-body on each side of the plant, and the plant itself is seen to be forming a new pair of leaves, on each side of which a new pair of flowering-bracts is also being formed, but they have not yet pushed their way through the opening so as to be visible. Figs. 73 and 75 are from a drawing by Miss Page sent to me by Mrs. L. Bolus, keeper of the Bolus Herbarium, Cape Town.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 80: 212. 1923.

(Continued from page 149)

XI.--PUNCTILLARIA, N. E. Br.

212

Very dwarf, succulent perennials, without internodes between the leaf-pairs. Leaves opposite, in 1-2 pairs or, under cultivation, sometimes 3 pairs to a growth or plant, those of each pair equal in size, spreading, very shortly united at the base except in *P. Roodiae*, usually three or more times (in one species usually less than twice) as long as broad, thick and fleshy, firm, usually very conspicuously dotted. Flowers solitary and terminal between the

212 leaves, sessile or shortly pedicellate, bracteate. Calyx- 5-6-lobed, sometimes produced above its union with the ovary into a short tube or cup. Petals numerous, free, linear. Stamens numerous, erect, and when the calyx has a tube above the ovary, arising from the top of that tube with the petals; staminodes none. Stigmas 9-15, filiform; no style. Ovary inferior, 9-15-celled; placentas down the centre of the outer wall of the cells and often extending part of the way up the central axis. Capsule (Fig. 104) subhemispheric, with 9-15 valves and cells; each valve with a pair of separated, parallel, expanding keels often ending in awn-like or membranous points and with membranous wings at the sides; cells acutely roofed with rather rigid dell-wings or separated elements of the cell-partitions with their outer ends turned back so as to form a somewhat trumpet-shaped opening to the cell, which is partly or nearly closed by a small or large tubercle (cell-wings flat and membranous and the tubercle rudimentary in *P. Roodiae*); the ridges formed by the roofs of the cells together with their turned-back ends form a series of small cavities alternating with the cells, the whole being raised in a sort of crown above the level of the expanding-keels. Seeds somewhat compressed-ovoid and a slightly angular from mutual pressure, with a nipple at one end.

Species 5, natives of the Karoo region of South Africa, the type of the genus being *P. magnipunctata* N. E. Br.

The name is derived from the Latin, punctillum, a dot, in allusion to the conspicuously dotted leaves.

This genus is closely related to *Pleiospilos* and, except in vegetative characters, is technically only to be distinguished from that genus by the opening to the cells of the capsule being nearly closed by a large tubercle. But this tubercle is doubtless of some functional importance to the plants having it, and as it is combined with a different type of foliage, I consider it to be quite as important a generic character as, for instance, the presence or absence of scales upon the claws of petals or at the mouth of the tube of a corolla are held to be. The function of these tubercles is very obscure; they occur in several distinct genera, as so far as I have been able to discover, they prevent, rather than aid, the dispersal of the seeds. They offer a problem that requires investigation, for Nature would scarcely develop such pronounced structures as these tubercles are unless they were to be of some importance to the plant. As I have previously stated, the fruits of these plants are the most complicated in the world of flowering plants and the most puzzling to understand.

KEY TO THE SPECIES.

- 1.--Leaves less (or not more) than twice as long as broad,
1-2 $\frac{1}{4}$ inches long, 8-14 lines broad, flat on the face,
very obtuse, flowers two inches in diameter, sessile.
5. *Roodiae*
- Leaves three to four (or more) times as long as broad. 2
- 2.--Leaves 6 $\frac{1}{2}$ -11 lines broad or perhaps sometimes broader, 1 $\frac{1}{2}$ -3 inches long, flat or faintly concave above; very conspicuously marked with large dots on a glaucous-green or brownish-tinted ground; flowers sessile, 2-2 $\frac{1}{2}$ inches in diameter.
1. *magnipunctata*
- Leaves 3 $\frac{1}{2}$ -7 lines broad, if very conspicuously dotted

- 3.--Leaves mostly $2\frac{1}{2}$ - $3\frac{1}{2}$ inches long, distinctly recurved at the upper part, tapering at the apical part to an acute point, distinctly concave on the face. 3. compacta

Leaves $1\frac{1}{2}$ - $2\frac{1}{2}$ inches long, not or but slightly recurved and mostly not tapering to an acute point, flat or but slightly concave on the face.

4

- 4.--Leaves with conspicuous and slightly prominent dots; flowers $2-2\frac{1}{2}$ inches in diameter on peduncles about $\frac{3}{4}$ -inch long. 2. sororia

Leaves with small and not very conspicuous dots that are not prominent; flowers $1\frac{1}{2}$ - $1\frac{3}{4}$ inch in diameter, sessile. 4. optata.

1. *F. magnipunctata*, N. E. Br. (Fig. 105).--Plant forming clumps 3-4 inches high. Leaves normally in 1-2 pairs to a growth, very stout, ascending-spreading, united for 4-6 lines at the base, varying in size on different plants, $1\frac{1}{2}$ -3 lines long, $6\frac{1}{2}$ -11 lines broad at the base, enlarging to 9-13 lines broad a little above the middle, 5-9 lines thick at the apex, flat or faintly convex or concave on the face and straight or very slightly recurved, base, bluntly keeled and trigonous with convex faces or triquetrous with convex faces at the apical part, obtuse at the apex in front and side views, surface glabrous, slightly harsh to the touch, variably light green, greyish green or more or less tinted with brownish, varying from slightly to very glaucous, everywhere covered with large dark green or blackish dots, which are slightly prominent on some plants and not so on others. Flowers solitary, terminal, quite sessile, bibracteate. Calyx unequally 6-7-lobes; lobes 4-7 lines long, ovate, acute or obtuse, some with membranous margins. Corolla $2-2\frac{1}{2}$ inches in diameter, opening in the afternoon and closing about 6 p.m.; petals numerous, in about 4 series, 7-12 lines long, $\frac{1}{2}$ - $\frac{3}{4}$ line broad, linear, obtuse and more or less bluntly toothed at the apex, bright yellow. Stamens erectly spreading, at first forming a somewhat funnel-shaped mass, becoming more spreading and looser, $3\frac{1}{2}$ -4 lines long; filaments and anthers orange-yellow. Stigmas 9-12, finally about as long as the stamens and four lines long, filiform, subplumose on the inner side, orange-yellow, suberect, seated on the conical top of the ovary, which is 9-12 celled. Capsule, when closed, 6-7 lines in diameter, somewhat hemispherical, flattened at the top, grey, dotted; when expanded well about an inch in diameter, mostly with 10-12 valves and cells, sometimes fewer; structure as described for the genus, the expanding-keels being awn-pointed; the whole of the interior is in effect of a dark brown, the cells being rather brighter than the rest and somewhat orange-brown, and the expanding-keels blackish. Seeds not numerous in each cell, about $\frac{1}{2}$ line long, compressed-ovoid, pointed at one end, minutely tuberculate, brown.

Mesembryanthemum Magnipunctatum, Haw., *Suppl. Pl. Succ.* p. 87 (1819), and *Rev. Pl. Succ.*, p. 86; Sonder in *Fl. Cap.* vol. II, p. 396; Berger, *Mesemb.* p. 264; *Zeitschr. f. Sukkul.*, vol. II, p. 160.

Laingsburg Division: Near Matjesfontein, Pillans, Austin, Frith, Originally discovered in this region by Bowie, who, accord-

212 ing to a note on the drawing of the type plant at Kew, "found it
growing on the heights near Sea Koe "river." I do not find this
river marked on modern maps. The note further states that "The
213 small variety (*B. duplominus* p. 88) mentioned by Haworth in his
Supplementum, proved afterwards to be precisely the same with
Burchell's plant." Prince Albert Division: Near Abrahams'
Kraal, Mrs. D. van der Bijl.

Fig. 105 is from a photograph taken in South Africa by Mr. T.
N. Leslie, and correctly represents the plant described by Haworth
as *M. magnipunctatum*, according to a fine coloured drawing of the
type preserved at Kew. There are, however, other plants in culti-
vation with narrower and more pointed leaves that pass under this
name, which I have had an opportunity of comparing with this
(the true *M. magnipunctatum*, Haw.), when in flower, to note if
any difference of a specific nature can be found in their flowers.

I am informed by Mrs. van der Bijl that this plant is eaten
by tortoises and is known as "Tortoise-food" or "schildpad kost,"
of the Dutch farmers. Dr. Muir also informs me that various
species of *Glottiphyllum* and some other genera are eaten by Tor-
toises and known by the same name.

2. *P. sororia*, N. E. Br.-- Plant forming chumps 2-4 inches
high with short, branching stems 2-4 lines thick. Leaves 4-6 to
a growth under cultivation, probably only 2-4 under natural condi-
tions, ascending or the outer spreading, very stout, $1\frac{1}{2}$ -2 $\frac{1}{2}$ inches
long 5-7 lines broad, 4-6 lines thick at the base and $4\frac{1}{2}$ -6 $\frac{1}{2}$ lines
thick near the apex, straight or occasionally slightly incurved and
often curved to one side, flat or slightly convex on the upper
side, rounded on the back at the base and obtusely keeled at the
upper part, viewed from above with nearly parallel sides or slight-
ly widened upwards to the middle or for three-fourths of their
length then tapering to a bluntly pointed apex, and in side view
usually slightly thicker near the apex than at the base, glabrous,
dull green, densely and conspicuously marked with dark green,
slightly prominent dots all over. Peduncle 1-flowered, 9 lines
long, 2-2 $\frac{1}{2}$ lines thick at the base, thickening upwards, terete,
with two bracts 5-9 lines long at its very base, light green,
sprinkled with some slightly darker green dots. Calyx 6-lobed;
lobes subequal 5-6 lines long and 2 $\frac{1}{2}$ -3 lines broad, ovate, acute or
obtuse, with a short dorsal point near the apex, some of them with
membranous margins, green or purplish-tinted, dotted with darker
green. Corolla 2-2 $\frac{1}{2}$ inches in diameter, opening late in the after-
noon; petals more than 100, in 4-5 series, the outer about 1-1 $\frac{1}{2}$
inch long, the inner shorter, $\frac{1}{2}$ - $\frac{3}{4}$ -lines broad, linear, acute or
obtuse or some of them notched at the apex, or of a rich yellow
and slightly shining on the inner face, whitish and tinted with
rose on the back. Stamens very numerous, at first erect, becom-
ing erectly-spreading, somewhat in a circle, so as to leave a cen-
tral space in which the base of the stigmas can be seen; filaments
yellow above, whitish at the base; anthers deep yellow. Style
none; stigmas 10-14, arising from the stout conical grooved top
of the ovary, 5 lines long, filiform, much longer than the stamens,
radiately spreading at the base, then erect, shortly plumose on
the inner side, greenish-yellow, paler than the others.

Mesembryanthemum sororium, N. E. Br. in Journ. Linn. Soc.
Bot., vol XLV, p. 72 (1920).

South Africa: locality and collector unknown.

Described from a living plant sent to me by Dr. F. H. Modier

213 Heath, who received it from a friend in South Africa and believed that it was collected in the Karoo region, possibly in Ceres Division.

This species is allied to *P. magnipunctata*, but differs from that species by its smaller leaves which are marked with smaller leaves, which are marked with smaller and less conspicuous dots, and by its distinct peduncle, the flowers of *P. magnipunctata* being sessile. From *P. ontata* it differs by its larger leaves which are more distinctly triangular in transverse section, and by the larger and distinctly pedunculate flowers.

The above is copied from my original description, and comprises all that I know about this species.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 80: 228. 1926.

(Continued from page 213).

XI.--PUNCTILLARIA, N. E. Br.

228

3. *P. compacta*, N. E. Br.-- Leaves about two pairs to a growth, spreading, slightly recurved at the apex, $1\frac{1}{2}$ -3 lines long, 4-6 lines broad and thick at the base, dilated to 5-8 lines broad and 5-7 lines thick below the apex, the basal part flat on the upper side and rounded on the back, and the upper part concavely channelled on the upper side and bluntly keeled on the back, tapering from 6-9 lines below the apex to an acute point; surface glabrous, dull green or brownish-green, with conspicuous, slightly prominent dots, slightly shining, slightly glaucous on the young leaves, scarcely so on the older ones. Flower subsessile or on a short pedicel 3-4 lines long, with a pair of bracts at its base. Calyx subequally 6-lobed, prominently dotted; ovary part hemispherically; lobes about 4 lines long, four of them with membranous margins. Corolla 2 inches or more in diameter; opening in the morning, scentless; petals in about 3 series, 12-15 lines long, $1\frac{1}{2}$ -2 lines broad, linear, acute, yellow, passing into white at the base. Stamens very numerous, erect, about 4 lines long; filaments yellow; anthers of a paler yellow. Stigmas about 16, erect, subulate, as long as the stamens, greenish-yellow.

Mesembryanthemum compactum, Ait. Hort. Kew. ed. 1, vol. II, p. 19(1789); Haw. Synon. Pl. Succ. n. 211. *M. nobile*, Haw. in Phil. Mag., 1823, p. 381; Salm Dyck, Mesemb. 4, f. 1; Sonder in Fl. Cap., vol. II, pl. 396; Berger, Mesemb., p. 264 and 263, f. 56, which is copied from that of Salm Dyck. *M. magnipunctatum* var. affine, Haw. Rev. Pl. Succ. p. 87.

South Africa: precise locality unknown.

This species has been long cultivated in gardens as *Mesembryanthemum nobile*, and is correctly so named, but it appears to be also undoubtedly the *M. compactum*, Aiton, and as the latter name is much older it must take precedence and therefore I have here restored it. Haworth states that he never saw this species, and places it under his section Rostrata (which I have separated as a genus-- Cheiridopsis), but in this he was undoubtedly wrong.

4. *P. ontata*, N. E. Br. Nearly stemless, branching at the base and forming a clump 2-2 $\frac{1}{2}$ inches high,. Leaves 2-4 to a growth, more or less spreading, equal 1-2 inches long $3\frac{1}{2}$ -6 lines broad and $3\frac{1}{2}$ -5 $\frac{1}{2}$ lines thick, and of nearly equal breadth and thickness through-

228 out, flat or slightly concave on the upper side, with obtuse or rounded edges, very convex and bluntly keeled on the back, obtuse or subacute at the apex, smooth, glabrous, dull brownish, reddish-grey or dark grey-green tinted with dull purple, faintly glaucous, thickly but rather inconspicuously dotted with darker green. Flower solitary, terminal, sessile, with a pair of bracts $2\frac{1}{2}$ -5 lines long at its base. Calyx 5-7-lobed, smooth, glabrous; tube above the ovary 2-3 lines long, cup-shaped; lobes reflexed or revolute, 2-4 lines long, ovate, obtuse, brownish, some with membranous white margins. Corolla $1\frac{1}{2}$ -1 $\frac{1}{2}$ inch in diameter, apparently remaining expanded day and night irrespective of cloud or sunshine if the temperature is warm enough and lasting 5-6 days, scentless; petals 50-60, free, in about 2 series, lax, arising from the top of the calyx-tube, spreading rather widely in the morning, becoming very revolute late in the afternoon and evening, 9-12 lines long, $\frac{1}{2}$ -1 line broad, linear or cuneately linear, often obtusely toothed at the apex, bright yellow fading into white at the base, paler on the back. Stamens numerous, erect, at first collected into a cylindric or slightly conical, dense bundle about 3 lines long, finally with some of the outer stamens separating from the bundle and standing erect or spreading loosely around it; filaments white; anthers deep yellow; no staminodes. Style none; stigmas 11-15, arising from the conical top of

229 the ovary, finally about as long as the stamens ($1\frac{1}{2}$ -3 lines long), filiform, erect, curved as or contorted at the tips, pale yellowish. Ovary conical at the top, 11-15 celled; placentas on the outer wall of the cells and also partly on the central axis. Capsule subglobose, 6-7 lines in diameter when closed, with 11-15 valves and cells; valves 3-4 lines long and about 1 line broad at the base, very acute, brown, with a very prominent membranous crest-like keel down the middle of the inner face; expanding-keels separate, parallel, stout, dark brown, about half as long as the valve and then produced into free, awn-like points with a membranous tapering wing on their outer margin and considerably shorter than the valve; cells as for the genus, each with its opening nearly closed by a compressed dark brown tubercle. Seeds $2/3$ -1 line in diameter, compressed, ovoid or suborbicular in outline, with a conspicuous nipple at one end, very minutely tuberculate under a lens, dark brown.

Mesembryanthemum optatum, N. E. Br., in Journ. Linn. Soc. v. XLV, p. 71 (1920).

Oudtshoorn Division: Bank Hoogte, Mrs. Wiggett 3, Marloth 6341.

A plant of this species flowered at Kew in November, 1917, but its place of origin was unknown, recently, however, it has again been introduced by Mrs. J. Wiggett, who discovered it at the locality mentioned.

The flowers of this species, although apparently expanded all day, open more widely late in the afternoon and evening than in the morning, and are sensitive to temperature. A coloured drawing of it that I have made (and which I hope to publish) represents the corolla as seen expanded in the morning, but in the evening of the same day the central part had opened more widely and the petals were very much rolled back, so that the calyx was entirely concealed. One afternoon, upon being removed from the greenhouse to a room of cooler temperature, the flower closed up, but during the evening when the room had become much warmer, it expanded again. So that it is evidently more sensitive to temperature than to sunlight.

5. *F. Roodiae*, N. E. Br. (Fig. 110).-- Plant stemless, forming clumps 1½-2 inches high. Each growth with two unequal or sub-equal leaves united for 6-9 lines at their base, the free part usually, but not always, longer than broad, 1-2½ inches long, 8-14 lines broad and 6-10 lines thick, ascending-spreading, deltoid or deltoid-oblong in outline viewed from above, flat on the upper side, rounded or obliquely and very obtusely keeled on the back, very obtuse at the apex, entire, dull greyish-green or brownish in nature, becoming greener under cultivation, thickly covered with slightly prominent dots that are not much darker in colour and therefore not so very conspicuous. Flowers not seen, but from the photograph reproduced in Fig. 110, solitary and terminal, sessile (but the fruit has a stalk about an inch long) bracteate. Corolla about 2 inches in diameter, expanding, according to Mr. Leslie, at 11.30 a.m. and closing about 5.30 p.m.; petals in 1-2 series, lax, recurved-spreading, 9-12 lines long, about ½-line broad, cuneately linear, obtuse or toothed at the apex, yellow. Stamens numerous, erect, apparently loose and arranged somewhat in a ring. Stigmas not seen. Capsule 4-5 lines in diameter when closed, shortly obconic, flattened at the top, grey, 7-8 lines in diameter when expanded, with 9-10 valves and cells; valves spreading or recurved; expanding-keels closely parallel or contiguous at the basal part, then diverging and ending in fine awn-like points a little shorter than the valves and with membranous marginal wings up to the base of the awns, the whole interior of the capsule of a light brown colour; cells roofed with semi-transparent, membranous, flexible cell-wings and with a small rudimentary hard pallid tubercle at the opening; placentas on the outer wall and base of the central axis. Seeds about 6½ in a cell, about 1/3-line long, ovoid, with a nipple at one end, smooth, brown.

Van Rhynsdorn Divison: near Van Rhynsdorn, Mrs. E. Rood.

This plant does not quite conform to the generic characters of *Functillaria*, and may when better known, prove to be a distinct genus. It differs by its leaves being mostly unequal and united at the base for a much greater length than they are in the other species of *Functillaria*, by the cell-wings of the capsule being membranous and flexible instead of stiff, and by the rudimentary nature of the tubercle at the mouth of the cells. Possibly the stigmas may differ also, but these I have not seen. In other general characters I find nothing to separate it, and therefore place it under this genus for the present.

N.B.-- I would here call attention to *Mesembryanthemum carinans*, Haw., which seems allied to the genus *Functillaria* and probably does not belong to that genus. It is at present quite an unknown plant except from the figure of the type plant preserved at Kew; for the species described by Sonder and by Berger as being *M. carinans* is not at all like the true plant, as I have previously stated in the *Journal of the Linnean Society*, vol. XLV, p. 66, where I have described Berger's plant under the name of *M. granulatum*, N. E. Br. There are also two or three other species distinct from *M. granulatum* that are named by South African botanists as being *M. carinans*, which are likewise quite different from the true *M. carinans*. I therefore here give a description of this species compiled from the drawing at Kew and including the characters given by Haworth. As the flowers are unknown its true generic position cannot at present be determined, but as it bears a somewhat

229 general resemblance to *Punctillaria compacta* (except that the tips of the leaves curve upwards instead or recurve and are more compressed), I think it best to call attention to it here.

Mesembryanthemum carinans, Haw., Rev. Fl. Succ., p. 90 (1821)
Plant stemless, forming clumps and having somewhat the general aspect of *Punctillaria compacta*, but with the leaves compressed and dilated at the keel near the apex. Leaves apparently 2-4 pairs to a growth, at first ascending, becoming widely spreading and curved upwards at the tips, 11-21 inches long, 4-7 lines broad at the very base, but rather abruptly contracted to 3-4½ lines broad a little above the base, thence with the upper side gradually tapering to an acute apex, semi-terete and 3-4 lines thick at the basal part, compressed and dilated at the keel of one leaf of each pair scarcely or not at all dilated there and acute in side view, flat or faintly concave on the upper side, rounded on the back at the base, keeled at the upper part; surface glabrous, slightly rough, glaucous-green, covered with numerous, conspicuous, slightly prominent darker green dots, which the artist seems to have indicated as being more prominent on the keel or that the keel is somewhat scabrid. Flowers unknown.

South Africa.

The above is all the information that can be at present be given concerning this plant.

(N. E. Brown)

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 81: 12. 1927.

(Continued. from page 229, Vol. LXXX.)

12 As a delay has been caused in the continuation of my account of this group by the want of sunshine experienced this year, delaying the flowering of some new species that I wish to include under the genus *Glottiphyllum*, which follows next in the sequence, and which are only now flowering, I take the opportunity to publish below a key to some new genera, and descriptions of new species belonging to the genera *Conophytum*, *Lithops*, etc., already dealt with. Most of them have not yet flowered in this country, but as the size, shape, surface and coloration of the growths are the principal characters that distinguish many of these peculiar plants, and as names for them are wanted in South Africa also for many that will soon be distributed by Monsieur Fr. De Laët, I have deemed it advisable not to wait until they all flower before describing them, proposing to publish descriptions of their flowers at a future time; meanwhile the names can be used.

Also I would like to correct an error to the key to the genera published in *The Gardeners' Chronicle* 1925, Vol. LXXVIII, p. 433, where the genus *Conicosia* (see under the coupled paragraphs Nos. 27 and 28) is stated to have alternate leaves. Haworth stated this to be the case. After having examined living adult plants, I came to the same conclusion, and therefore accented this view for the purpose of my key, but having this year raised a few plants of this very distinct genus from seeds and watched their development, I find to my surprise that the leaves are really all opposite, although by a peculiar mode of growth as the plant develops they point all ways and form a large, dense tuft in which they appear to be arranged alternately and are very long.

The following is a key to some new genera, founded partly upon new discoveries and partly upon old species that I had either not seen or of which I had only incomplete material when making my previous key, and although I then believed them to belong to new genera, I preferred to wait until actual material was available for examination before founding genera upon them, hence their omission from the previous key. Numbers are added indicate their previous key. Numbers are added to indicate their approximate position in the sequence adopted, and I have also indicated the type species of each genus. Full descriptions will follow as each genus is dealt with in its sequence.

KEY TO NEW GENERA.

1. Annuals; leaves opposite, flat; flowers solitary; pedicels 2-6 inches long; calyx unequally 5-lobed; petals free, slender, passing into staminodes; capsule expanding its valves when wetted; placentas on the floor of the cells. 2

Perennials; leaves opposite, not flat; flowers solitary; pedicels under 2 inches long or flowers sessile; calyx 5-6 lobed; petals free; capsule expanding or separating its valves when wetted; placentas on the floor of the outer wall of the cells. 3

2. Leaves petiolate, with a lanceolate or ovate flat or concave blade, glabrous; stigmas 10, filiform; ovary inferior, 10-celled; capsule with 10 valves and cells; expanding-keels of the valves central, more or less contiguous at the upper part and separated at the base or subparallel through-out entirely adnate without free tips or wings; cells without cell-wings or tubercles; seeds globose, smooth.

Species 2, *A. Fillensii*, N. E. Br., the type of the genus, and *A. helianthoides*, N. E. Br. (*Mesembryanthemum helianthoides*, Ait.) 27b *Apatesia*.

Leaves linear to narrowly oblanceolate, pubescent; stigmas 12-15; ovary nearly or quite superior, 12-14 celled; capsule with 12-14 valves and cells; expanding keels of the valves arising quite at the margins of the valves and inflexed so that their edges are nearly or quite contiguous, and ending in free diverging awns; cells narrow, roofed for half their length, without a tubercle at the opening; seeds flattened, D-shaped, smooth.

Species one, *M. Candollii*, N. E. Br. (*Mesembryanthemum Candollii*, Haw.) 27a *Macrocaulon*.

3. Capsule small and thin, separating into 5 valves or parts with the cell-partitions adhering to the centre of each part and separating from the central axis so that the ellipsoid, smooth seeds are liberated; a very small, tufted plant; leaves semiterete or subtrigonous; stamens about 25, in one series, erect; stigmas 5, subulate; ovary partly superior, 5-celled; placentas on the base of the outer wall of the cells.

Capsules not thin and provided with expanding-keels to their valves, which expand when wetted; stamens numerous in many series.

4

4. Stamens erect and evident.

5

Stamens concealed under a mass of inflexed petals and staminodes; a shrub; leaves with the acute edges and keel finely lacerate-toothed; flower 2 inches in diameter, purple; stigmas 10, very small; ovary 10-celled; valves of the capsule ascending-spreading when expanded and not closing after once expanding, their expanding-keel diverging and ending in awn-like points; cells roofed with rigid cell-wings, without a tubercle at the opening.

The type of the genus is *S. lacera*, N. E. Br. (*Mesembryanthemum lacera*, Haw.) 41a *Semnanthe*.

5. Stigmas and cells of the ovary and valves of the capsule 5; dwarf plants forming clumps about 3-3½ inches high; leaves trigonous, tapering to an acute apex as viewed from the face; with 1-2 small teeth on the keel at the apex; stigmas plumose; ovary inferior; valves of the capsule suberect or somewhat inflexed when wetted, with diverging, expanding-keels ending in awn-like points; cells roofed with rather stiff cell-wings and the opening nearly closed by a large, compressed tubercle.

The type species is *A. bellidiflorus*, N. E. Br. (*Mesembryanthemum bellidiflorum*, Linn.) 34a *Acrodon*.

Stigmas and cells of the ovary and valves of the capsule 8-10

6

6. Leaves with several slender flexible teeth along the edges and keel, velvety-puberulous to the touch and dotted; calyx 5-lobed; stigmas 9-10, subulate; ovary inferior; valves of the capsule reflexed when expanded, with parallel expanding-keels toothed on their edges and ending in free membranous tips; cells roofed with stiff cell-wings and the opening roofed with stiff cell-wings and the opening nearly closed by a large tubercle; seeds compressed-ovoid, smooth.

The only known species is *O. Marlothii*, N. E. Br. 40b *Odontophorus*.

Leaves quite entire and smooth at the edges and keel, glabrous, not dotted.

7

7. Shrubby plant 1-2 feet high with very distinct internodes. 8

Plant 3-4 inches high; leaves stout, united for some distance at the basal part, somewhat compressed, bluntly keeled, not dotted; calyx 5-lobed; petals passing into staminodes; filaments of the stamens bearded; stigmas 10; capsule very shallow; expanding-keels very broad

and closely contiguous, quite covering the basal half of the valves, convex (not acutely keeled) on the top, produced into a small, stiff, obtuse wing at the apex, cells open, without a tubercle; seeds compressed, triangular in outline, smooth.

The type species is *Z. suppositum*, N. E. Br. (*Mesembryanthemum suppositum*, L. Bolus). 39b *Zeuktophyllum*.

8. Erect shrub; leaves but slightly united at the base, not stout; semiterete; flowers at first terminal, later becoming apparently axillary all along the branches; 15 lines in diameter, yellow; calyx 6-lobed; stamens numerous, erect; stigmas 8-9, plumose; ovary inferior, 8-9-celled; placentas on the outer wall of the cells.

The type of this genus is *M. mollis*, N. E. Br. (*Mesembryanthemum molle*, Ait., not of any other author.) 40a *Malephora*.

(N. E. Brown)
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 81: 31. 1927.
(Continued from page 12.)

1. CONOPHYTUM, N. E. Br.

- 31 The following species are mostly additional to those already published in *The Gardeners' Chronicle*, 1922, vol. LXXI, p. 198, and 1925, vol. LXXVIII, p. 450, and indicate that this genus is a very large one. A century ago about ten species were known; at the present time (including those described below) over ninety species have been described, most of which I have in cultivation, and considering the vast area in South Africa in the region where these plants thrive that is as yet unexplored, there are doubtless very many more awaiting discovery, besides several new ones I possess that will be described later.

As I have previously stated, it is almost impossible to make descriptions of these very remarkable plants from which they can be identified, as they have no parts or organs by which they can be contrasted for that purpose. And it is very unfortunate that very little is known of their range of variation, as this has never been investigated in their native country. But from material that has been sent to me from the same general region inhabited by a given species, received sometimes from the same contributor at different times, sometimes from different contributors, I find that some species undoubtedly vary considerably in appearance, so much so, that without knowledge of their origin, most would con-

- 32 sider them, in certain cases, to be distinct species. I find this to be particularly the case with *Conophytum ruscitum*, *C. polulum*, and *C. truncatellum*, and species of *Lithops* also vary very much. Therefore, plants from the same general locality that show some affinity to one or other, and at the same time seem quite distinct in markings or appearance should be suspected to be variations of one species until flowers or other characters definitely prove them to be distinct. When raised from seeds taken from the same plant, I have found some species to vary greatly, and in the case of

32 *C. polulum* and *C. placitum* repeating the marked variations of plants received direct from South Africa.

One of the best characters by which nearly allied but really different species can be discriminated is the minute structure of the epidermis as seen under a moderately strong pocket lens. The character of the epidermis when it differs, must, I think, indicate a real specific difference, in the appearance of the plant, but, unfortunately, it is a distinction that is not always a describable one.

Figures of the types of form alluded to in the descriptions will be found in The Gardeners' Chronicle for 1925, vol. LXXVIII, p. 450.

All the species are arranged alphabetically and those described as new below are quite distinct from all others; in surface-contour the angular form of *C. novellum*, and the very distinctly prominent separate dots of *C. praeparvum* cause these two species to stand out as being remarkably different from any others at present known. The peculiar loosely-forked stems of adult plants and neat-looking growths of *C. Marlothii* also mark this one of the most striking in the genus.

Apart from the genera *Lemna* and *Wolffia*, the individual growths of the smaller species of this genus *Conophytum* are, I think, the smallest among flowering plants, and the flower is sometimes 3-4-times the diameter of the growth in size, as, for example, in the exceedingly beautiful *C. minusculum*.

C. andausanum, N. E. Br.-- Growths as received, 5-6 lines high, 5-6½ lines broad, and 4½-5 lines thick, slightly compressed-obcordate, with a notch about 1 line deep at the top, and the lobe on each side of it rounded on side view and obtusely keeled; smooth, glabrous, dull green, sparsely sprinkled with small dark green dots, and with the notch outlined with a dark green or purplish line, from each side of which there extends a similar green or purplish line along the keel of the lobes. Flowers unknown.

Little Namaqualand: At Andaus Poort near Anenous, in the Richtersveld, Marloth 6908.

This species is nearly allied to *C. diversum*, described below, but differs very distinctly by the very conspicuous continuous line that outlines the notch and extends along the keels of the lobes.

The alliance of both these species appears to be with *C. gracilistylum*, N. E. B.r.

C. clarum, N. E. Br.-- Growths as received small, about 4 lines high, 2-2½ lines broad, and 1-2 lines thick, obconic, elliptic in outline and broadly rounded at the top (type L. or E.), with a very slight central notch; orifice ½-¾-line long, very slightly depressed below the general level of the top, which is convex (not ridged) as viewed transversely to the orifice; surface smooth, glabrous, of a bright clear green, not at all shining, thinly sprinkled on the top with 20-30 small, dark green separate dots, and with a dark green blotch at end of the orifice, usually formed of 3-5 dots connected together, and the blotches occasionally connected by very slender, dark green lines, so as to outline the orifice, which otherwise is not very distinct. Flowers not seen. Capsule 2 lines in diameter, 5-angled, with 5 valves and cells, slaty-grey. Seeds minute, scarcely ¼-line long, smooth, brown.

Calvinia Division: growing on or among granite rocks on the foothills of the Langeberg range, Pole Evans 6022.

Described from a living plant kindly sent to me by Dr. Fole Evans. This is a bright looking little species, quite distinct from any other I have seen.

C. Comptonii, N. E. Br. (Fig. 20).-- Growths very small, as received 2 lines high and 1-2 $\frac{1}{2}$ lines in diameter, but will probably become larger under cultivation; obconic, convexly-subtruncate at the top, which is curcular or elliptic in outline and has a faint keel across it transverse to the orifice, which is 2-2 $\frac{2}{3}$ line long, and distinctly depressed at each end; surface glabrous and slightly irregular from the markings being faintly elevated, greyish green with a faint brownish tint, with a horse-shoe-shaped mark or very dark green at each end of the orifice and a series of small dark green dots and markings around the margin of the top. Flowers not seen.

Malmesbury Division: Near Nieuwoudtville, Compton.

For this minute but very distinct species I am indebted to Professor R. H. Compton, the Director of Kirstenbosch Botanic Gardens, after whom I have named it. Although a large genus, the species are grouped into few types, many kinds having a similarity in general appearance, but this very interesting species agrees with none of them, being quite distinct from all that are known to me, and therefore, although very small, by its great distinctness all the more suitable to bear the name of its energetic discoverer.

C. diversum, N. E. Br.-- Growths as developed the first year after importation about 6 lines high, 4-5 $\frac{1}{2}$ lines broad and 3 $\frac{1}{2}$ -5 lines thick, slightly compressed, cuneately obcordate, 2-lobed at the top, with the notch 1-2 lines deep and the lobes more or less closed together at their lower half, at least in the young state of the growth; lobes rounded at the top in side of the growth; lobes rounded at the top in side view, somewhat as in type P, somewhat compressed laterally into an obtusely-rounded keel; surface smooth, glabrous, light green, with a small and slightly darker patch at the base of the notch, and thinly sprinkled all over with very small, darker green, separate dots, but without a dark line along the keel of the lobes or around the lips of the orifice. Flowers not seen.

Little Namaqualand: near Anenous, in the Richtersveld, Marloth 6906.

C. ectypum, N. E. Br., in The Gardeners' Chronicle, 1925, vol. LXXVIII, n. 468. At the place quoted, the description of the flower was made from a dried flower sent to me by Dr. Marloth, and the colour appeared to be magenta, as there described. My plant of Marloth 6365B, having now flowered, I find that the petals are not magenta, but of a delicate rose-pink, and there are four series of stamens and the style is 5 $\frac{1}{2}$ -6 lines long, instead of being as described. Whether this species varies to this extent, or whether some mistake was made in the flower sent to me, I do not know; flowers developed in future may determine.

C. Brownii, Tischer in Moller's Deutsche Gartner-Zeitung, July 21, 1926, n. 257 is, in my opinion, a mere form of *C. ectypum* that is more truncate at the top and has very few more lines upon it; there is no other difference. Both plants were collected at the same locality, and were both sent by Dr. Marloth. I find that several species vary much in shape and markings so that without other evidence I do not regard them of specific importance when the various

C. flavum, N. E. Br.-- Growths 4-7 lines high and 3-6 lines in diameter, obconic, circular or elliptic in outline viewed from above, convex on the top, with a slight notch at the orifice on the larger growths only (type E.); orifice 1-2 lines long, slightly depressed, not gaping; surface smooth, glabrous, greyish-green, purplish on the sides, with the orifice outlined by a thick, dark green line and with some (not very numerous) separate dark green dots scattered over the top. Calyx 5-lobed; tube (but not the ovary) exserted, about 3 lines long, pale greenish; lobes 1-1½ line long, oblong, obtuse or subacute, green or perhaps reddish in full sunshine, pellucid-dotted. Corolla 6-7 lines in diameter, expanding in the morning in bright sunshine, closing at the latter part of the afternoon, not scented; tube finally about 1½ line longer than the entire calyx, pale yellowish; petals about 55 in about 2 series, 3-3½ lines long ½-2/3 line long, linear, obtuse and slightly notched at the apex, bright golden yellow, shining. Staminodes none. Stamens about as many as the petals, in 2-3 series, all collected together at the mouth of the corolla tube and more or less exserted from it; filaments yellow at the upper part; anthers of the same yellow as the petals. Style 4 lines long nearly as long as the stamens, slender, with 4 minute stigmas ½-line long at the top, yellowish at the upper part, greenish below. Capsule when closed about 2 lines in diameter, obconic, flat on the top, with 5 valves and cells. Seeds about ½-line long, smooth, pale brown.

Little Namaqualand, on shale rock, near Steinkopf, Marloth 6904, Meyer (Marloth 6319).

Described from a living plant kindly sent to me by Dr. R. Marloth. It is the first species I have seen of the small ovconic type that has bright yellow flowers opening in the morning in sunshine.

C. hians, N. E. Br.-- Growths they are first after importation 2-4½ lines high, 2-4 lines broad, 1½-3 lines thick, slightly compressed obovoid or obconic, very shortly 2-lobed from a very gaping notch ½-1 line deep, and ½-1½ line wide at the top (type somewhat as at B.); lobes slightly keeled on the top, rounded into the back in side view; surface smooth, minutely puberulous and somewhat velvety to the touch, light green, without dots, but the keel of the lobes becoming reddish and the notch distinctly outlined with a darker green or perhaps reddish line when exposed to full sunlight. Flowers not seen.

Little Namaqualand: Locally frequent at Lekkersing, in the Richtersveld, Marloth 6915, 6928, 6929.

Described from living plants received from Dr. Marloth. Its small size, puberulous surface, gaping orifice and absence of markings clearly distinguish this from all other species.

C. kubusanum, N. E. Br.-- Growths 2-3 lines high and 2-3½ lines in diameter, shortly obconic, circular in outline viewed from above, and nearly flat on the top or very slightly depressed at the centre (type nearly like F.); invested in friable, greyish sheaths; orifice ½-line long; surface smooth, glabrous, of a rather dark dull grey-green, marked with numerous separate scattered dots of darker green on the top and the orifice outlined by a dark line. Flowers not seen.

Little Namaqualand: At Kubus, in the Richtersveld, Marloth 6920.

- 32 Described from a living plant kindly sent to me by Dr. Marloth, who has included under the number 6920 what appear to me to be two distinct species. One of them is the type of *C. kubusanum*, and is described above this has the growths densely crowded. The other form has the growths rather loosely clustered, they are 4-5 lines long and smaller in diameter than the plant above described,
- 33 are elliptic instead of circular in outline and convex on the top, but the markings are very similar to those of the plant described, but fewer. Until both flower I cannot determine if these are distinct, as I suspect, or only varieties of one another.

C. limbatum, N. E. Br.-- Growths 5-7 lines high, $2\frac{1}{2}$ -4 lines broad and $2\frac{1}{2}$ -4 lines thick, somewhat obovoid, slightly notched at the top with a slight and very obtuse ridge transverse to the notch, circular in outline viewed from above (type L., on a small scale); orifice about 1 line long, with garing, triangular lips; surface smooth, glabrous, green, with a broad dark green line around the orifice and usually a dark green (or under continuous sunshine probably purplish) line along the top of the lobes, with or without another line or dot or two on each side of it, which are not raised above the general level. Flowers not seen; stated by Dr. Marloth to be purple.

Little Namaqualand; near Steinkof, Meyer (Marloth 6508).

This is evidently closely related to *C. ectypum*, N. E. Br., but as cultivated by myself under the same conditions it appears to be distinct. It is rather larger and of a lighter green colour, the orifice is less defined, the dark markings are not raised as they are in *C. ectypum*, and when examined under a strong lens the microscopic structure of their surface is quite different; in *C. ectypum* the dark markings under a lens appear very smooth and shining or polished, and the stomata (seen as minute whitish dots) are in a network of faint depressions and appear as paler patches between the dark polished lines on the top, but in *C. limbatum* the dark markings are not so shining and are seen to be minutely and densely pitted, and the stomata do not form pale patches between them; the corolla is light rose-pink in *C. ectypum*, but is stated to be purple in *C. limbatum* by Dr. Marloth, and when better known may prove to show a difference in structure.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 81: 52. 1927.

(Continued from page 33.)

- 52 *Cononophytum Marlothii*, N. E. Br. (Fig. 30).-- Plant as received about $\frac{1}{2}$ -1 inch high, consisting of a few lax and rather distant forked stems, each ultimate branch 4-6 lines long, gradually increasing in diameter upwards and $2\frac{1}{2}$ -3 lines in diameter at the top, densely clothed with somewhat smooth, closely imbricating sheaths; rather hard in texture, dark brown edged with whitish. Growths 3-4 lines long and 3-4 lines in diameter obconic, circular or broadly elliptic at the nearly top (type F.), with a depressed orifice $\frac{1}{2}$ -1 line long; surface smooth, glabrous of a greyish glaucous-green, thinly sprinkled with separated darker green dots

52 and the orifice surrounded by an elliptic dark green line or row of dots; when in active growth, if held at a proper angle to reflected light the dots (when viewed with a lens) are seen to be shining while the rest of the surface is opaque. Flowers not seen.

Little Namaqualand: Ugrabis Mountain, in the Richtersveld, Marloth 6941.

Of all the species sent to me by Dr. Marloth that he collected during his expedition to the Richtersveld, in Little Namaqualand, this humble species appealed to me as being the most distinct in its general appearance; I have therefore much pleasure in dedicating it to his memory as a slight but grateful acknowledgement of the aid and information he has on many occasions given me during my work upon these plants. *C. Marlothii* differs from all known species by its laxly-forked stems clothed with hard, smooth, brown sheaths, very different in character from the brown sheaths, very different in character from the brown, grey or white friable sheaths that are usually found on these plants and by its small, flat-topped growths, sprinkled with dots that shine when held at a certain angle to the light, while the remainder of the surface is opaque.

To a certain extent the growths of *C. Marlothii* resemble those of *C. iubusum*, but in the latter species they are smaller, of a darker green, more crowded, and not on lax stems, and have friable greyish sheaths, and the dots are more numerous.

For the illustration of this species I am indebted to the courtesy of Monsieur Fr. de Laet.

C. Meyer, N. E. Br. (Fig. 31). -- I am now able to illustrate this species from an excellent photograph sent to me by Monsieur Fr. de Laet.

C. misellum, N. E. Br.-- Growths small, 4-5 lines high, 2½-3½ lines in diameter, obovoid, elliptic or circular in outline viewed from above, convex at the top, with a slight notch at the orifice (type somewhat like *E.*), and a faint keel on each side of it; orifice ½-line long; surface smooth, glabrous, green, with a darker line along the keel and another outling in the lips of the orifice, and a few separate dark dots irregularly scattered over the top, but all these markings are rather indistinct, yet in full sunshine the line on the keel would probably be purplish. Flowers unknown.

Little Namaqualand: Witklip Poort, near Ugrabis, in the Richtersveld, Marloth 6933.

This small species is but little larger than *C. saxetanum*, N. E. Br., which it somewhat resembles in general appearance. Described from a living plant sent to me by Dr. Marloth.

C. Muiri, N. E. Br.-- Growths as received small, nearly as type *E.*, 3-4 lines high and 2-4 lines in diameter, elliptic or nearly circular in outline and convexly flattened at the top, with a very slight notch at the center and no trace of any ridge; orifice ¼-½ line long; surface smooth, glabrous, of a light glaucous-green or chalky-green colour, indistinctly marked with irregularly scattered dots of a slightly darker tint, usually separate, but on some growths here and there connected into lines and the orifice enclosed in an elliptic or diamond-shaped line of the same dark tint. Calyx-tube about 1½-line long and ½ line in diameter, 4-5 lobed; lobes ½ line long, ovate, reddish. Corolla-tube about as long as the calyx-

53 tube; petals about 16, in 1-2 series, 14-16 line long and about 1/6 line broad, filiform-linear, obtuse, pale yellow. Stamens few, in two series, exerted from the corolla-tube. Style very short or almost absent. Stigmas 4, about 2/3 line long, filiform, erect, attaining to about the middle of the corolla tube.

Ladismith Division: Among stones and rocks on hillsides south of Touws Berg, Muir 883.

The small size, flattish tops and glaucous-green colour of the growths of this species as seen the first year after its importation readily distinguishes this plant from all others are at present described. I am indebted to Dr. J. Muir for the living plants from which I describe, and am glad of the opportunity to associate his name with a member of this genus. I suspect, however, that after it has been in cultivation for awhile its size and, perhaps, appearance will have altered.

C. novellum, N. E. Br.-- Growths as received 4-6 lines high, 4-5 lines broad and 4-4 1/2 lines thick, obconic, elliptic or nearly circular, and at the same time faintly angular in general outline viewed from above, somewhat truncate in side view, but having a distinct ridge across the top transverse to the orifice and 2-3 somewhat angular bumps on each side of it; orifice 1/2-1 1/2 line long, closed; surface smooth, glabrous, light green, sometimes with, sometimes entirely without a few rather indistinct separate darker green dots sparingly scattered over the top, and the orifice sometimes is very indistinctly outlined with a darker green line parallel to it on each side, but more often this outline is absent. Flowers unknown.

Clanwilliam Division: Near Klaver, Marloth 11899.

This species is distinguished from all others by the peculiar angular bumps upon the top of the growths. Described from a living plant received from Dr. Marloth.

C. obscurum, N. E. Br.-- Growths 3-4 lines high, 2-3 lines in diameter the first year after importation; obconic, circular or elliptic in outline viewed from above, flattish on the top (type F., without the notch), with only the orifice itself depressed and no trace of a keel; orifice 1/2-1 line long; surface smooth, but under a lens there sometimes appears to be a slight unevenness, glabrous, of a rather dark green sparingly marked with a few separate dots of darker green, but the orifice is not outlined with a darker colour in any way. Flowers not seen.

Little Namaqualand: Ugrabis Mountain, in the Richtersveld, Marloth 6938.

Described from a living plant received from Dr. Marloth. It is rather insignificant in appearance, but is quite distinct from all others known to me.

C. picturatum, N. E. Br.-- Growths as received 3-4 lines high, 3-5 lines broad, and 2 1/4-2 1/2 lines thick, shortly obconic elliptic or nearly circular in outline, and flat or convex at the top (type E or F); orifice 1/2-1 line long, level with the general surface, not at all depressed; surface smooth, glabrous, purple on the sides, the top grey-green, prettily and rather copiously marked and the orifice outlined with dark green or purple, stout, irregular lines or chains of connected dots, which are more or less connected together in an irregular manner, but form no definite pattern. Flowers not seen.

53 Clanwilliam Division: Between Clanwilliam and Citrusdale,
Miss Foote.

I have to thank Professor R. H. Compton for this very distinct species, which he informs me was discovered by Miss V. J. Foote, a former assistant in Kirstenbosch Botanic Garden.

It is one of the prettiest species known to me, and is easily recognised by the top of the growths being flat and covered with irregularly branched and connected rather thick lines of dark green or purple, according to exposure to sunshine.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 81: 70. 1927.

(Continued from page 53.)

70 *Conophytum praeparvum*, N. E. Br. (Fig. 38)-- Growths as received very small, crowded, 2-3 lines long and 1-2 lines in diameter, shortly obconic or obovoid, elliptic or circular in outline and convex without any trace of a ridge across it at the top; orifice $1/3$ - $1/2$ line long, level with the surface and neither depressed nor rising; surface glabrous, light green, sprinkled over the top with a few scattered dark green or purple dots that are mostly separate, but occasionally are connected into short lines and are remarkably prominent, resembling little bumps on the surface when viewed sideways with a lens, 2-3 of them are grouped at each end of the orifice, which also has a very slender dark green line on each side of it. Flowers not seen.

Little Namaqualand: On the Langebergen near Garies, growing among or mixed with lichens on granite, Marloth 12887.

This is one of the smallest species of this genus known to me and is one of the smallest of flowering plants. I am indebted to Dr. R. Marloth for living specimens of it, from which the above description was made. Its small size and the very prominent bump-like dots upon it readily distinguish it from all other known species. As a lichen was growing mingled with the plants sent, it is evidently one of the species that grow among lichens, a habitat shared by other members of this genus.

C. retusum, N. E. Br.-- Growths $1/2$ -1 inch high, 3-9 lines broad across the top and 2-4 lines thick on their first development after importation, normally compressed and wedge-shaped, shortly two-lobed at the top, and when fully developed about twice as broad across the lobes as at the base; in this form the lobes are 1-2 lines long and in side view are somewhat truncate with a slight notch (retuse) at their top, bluntly keeled; in another form produced on the same plant the growths are somewhat obovoid and not at all wedge-shaped, and the top of the lobes in side view are rounded and not at all divergent or truncate; orifice $1 1/2$ - $2 1/2$ lines long; surface smooth glabrous, light green with a darker patch at the base of the notch and some rather indistinct separate dots scattered over the surface; more evident on some growths than on others, while the lips of the orifice are somewhat indistinctly outlined with a dark green line or chain of dots. Flowers not seen. Capsule 2 lines in diameter, slightly 5-angled, shortly and broadly obconic, slight convex on the top, with 5 valves and cells brown; when expanded $3 1/2$ -4 lines in diameter with recurved brownish

70 valves; extending-keels contiguous and forming a stout, acute, brown, central keel with broad, membranous pallid, marginal wings; cells open, no tubercle. Seed about 1 line long, ovoid, but much compressed, with a very prominent nipple at one end, smooth, brown, the nipple darker.

Little Namaqualand: On rocks, in the gorge of the Kawaress River, in the Richtersveld, Marloth 6925.

This plant I also owe to the kindness of Dr. Marloth. It belongs to the same group as *C. Elishae* and *C. bilobum*, but differs from all other species that I have seen in its very distinctly and broadly wedge-shaped growths, with the top of their lobes slightly notched or truncate. Whether it will retain this unique character under cultivation remains to be seen, as I notice that some of the new growths are quite different in form, being obovoid with short, rounded lobes on each side of the notch.

C. tantillum, N. E. Br., in *The Gardeners' Chronicle*, 1926,, vol. LXXIX, p. 12. This distinct species having now flowered with me, the following corrected description of the flower may be added: Calyx-4-lobed, tube only partly exerted, 3 lines long, whitish or pale greenish; lobes $\frac{1}{2}$ - $\frac{3}{4}$ line long, greenish, but probably reddish in full sunshine. Corolla 6-7 lines in diameter, expanding in daytime in dull or sunshiny weather, not scented; tube 5-6 lines long and 1-2 lines longer than the entire calyx, nearly 1 line thick, whitish; petals about 20, recurved-spreading, in 1-2 series, 3-3 $\frac{1}{2}$ lines long and $\frac{1}{2}$ - $\frac{3}{4}$ lines broad, linear, obtusely rounded or faintly notched at the apex, bright magenta. Staminodes none. Stamens 25 or more, in about 4 series, in two upper series exerted from the mouth of the corolla-tube; filaments and anthers yellow. Style 6 lines long and nearly as long as the longest stamens; stigmas 4, minute, $\frac{1}{2}$ line long, yellow.

Little Namaqualand; near Steinkopf, Meyer, (Marloth 6512)

This is quite a pretty plant when nicely in flower, although it cannot vie with the beautiful *C. minusculum*, which has much larger and much more richly-coloured flowers.

3. LITHOPS, N. E. Br.

The following species are additional to those already described in *The Gardeners' Chronicle* 1922, vol. LXXI, p. 55, and 1926, vol. LXXIX, p. 80.

Lithops Fulleri, N. E. Br.-- Growths about an inch high, 12-15 lines broad and 8-10 lines thick, obconic, elliptic in outline at the fat top which has a fissure 5-6 lines deep across it, dividing it into two contiguous lobes; surface glabrous, smooth on the sides and margins of the top, which is rough from being covered with small bumps caused by numerous impressed dendritic markings, light dove-grey with a slight violaceous tint on the sides and margin of the top, and the dendritic markings of a bright-rust-brown colour, making a very pleasing contrast. Flowers not seen.

Kenhart Division: Near Kenhart, Fuller.

This very distinct species was very kindly sent to me by Professor R.H. Compton, Director of Kirstenbosch Botanic Garden, with the information that it was discovered near Kenhart by Mr. E. A. Fuller, to whom I have much pleasure in dedicating this very pretty species, which is, perhaps, more nearly allied to *L. karasmontana*, N. E. Br., than any other known species by its more crowded dendritic

70 markings, rougher top and different colouration, and probably when flowers of it are known they also will differ, for in my opinion it is certainly not a mere variety of that plant.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM

Gard. Chron. III. 81: 84. 1927.

(Continued from page 70.)

LITHOPS.

- 84 *L. bella*, N.E.Br., in The Gardeners' Chronicle 1922, v. LXXI, p. 80 (Fig. 44). To this species must now be added as a synonym *L. Lericheana*, Dinter and Schwantes, which I had not seen when I described it in The Gardeners' Chronicle, 1926, vol. LXXIX, p. 102, but as I now have plants of *L. Lericheana* in cultivation, I find it to be identical with the previously described *L. bella*. A good figure of *L. Lericheana* was published in the Zeitschrift f. Sukkulentenkunde, December, 1925, p. 153, which exactly represents *L. bella*. I have not seen this figure when my description of *L. Lericheana* was published in February, 1926, or I should then have quoted it, but now, by the courtesy of Dr. F. Vaupel, the Editor of the work quoted, I am here able to reproduce the figure (Fig. 44) from a photograph of it, for which I am indebted to Mr. C. A. Maess.

L. Mundtii, Tischer, in Mollers Deutsch Gartner Zeitung, September 21, 1926, p. 330, with three figures (Fig. 45).-- Growths 15-18 lines high, 14-20 lines broad, and 10-18 lines thick, ob-conic, quite flat on the top, with a transverse fissure about 3 lines deep all across it; surface glabrous, smooth and of a light violaceous tint on the sides, slightly rugose from impressed dendritic markings or branching lines on the top, which is of a light rust colour with the impressed markings of a dark rust colour, and with numerous blackish-grey dots sprinkled among the markings. Calyx 4-lobed. Corolla about 14-18 lines in diameter; petals 30-35, in 2 series, orange-yellow, with the tips reddish on the back. Stamens with white filaments and yellow anthers. Stigmas 6, not exceeding the stamens.

Great Namaqualand: Mundtfarm, near Witvley, in the region of Gobabis, Mundt.

This fine species is distinguished at sight from all others that I have seen by the rich rust colour of its flat top. Fig. 45 is here reproduced by the permission of Dr. F. Vaupel, the Editor of Zeitschrift f. Sukkulentenkunde by means of a photograph kindly sent to me by Mr. C. A. Maess.

L. pseudotruncatella var. *alta*, Tischer, in Moller's Deutsche Gartner-Zeitung, September 21, 1926, p. 331, with fig. A variety differing from the type of being taller than broad, with the top of the lobes more convex and the markings less distinct. Corolla yellow. Capsule 8-celled.

Great Namaqualand: Farm Hoffnung, collector not stated.

I have not seen this plant, but it is probably the plant Dinter has mentioned in one of his works as being *mesembryanthemum truncatellum* growing at Farm Hoffnung, and for which I quoted that

84 locality on his authority under *L. pseudotruncatella* in The Gardeners' Chronicle, 1922, vol. LXXI, p. 65, and the localities Jakalswater and Roessing also mentioned there upon Dinter's authority, doubtless also belong to a different species, the Roessing plant probably being *L. Ruschiorum*, N. E. Br., as I learn from Dr. A. Tischer that the true *L. pseudotruncatella* is only found in the Aus Mountains and near Windhoek.

85

RIMARIA, N.E. BR.

Rimaria microsperma, N.E.Br. (Fig. 46).-- Stemless or nearly so under natural conditions. Growths solitary or two or perhaps more to a plant. Leaves 1-2 pairs to a growth, closed together or gaping, united at the base, in adult plants 12-13 lines long, 12-15 lines broad and 10 lines thick, half-globose, flat on the face, rounded on the back, obscurely keeled at the apical part and rounded or minutely apiculate at the apex; surface glabrous, very minutely-granulate under a lens, reddish-grey on dove colour, indistinctly dotted. Flower solitary, terminal. Pedicel 7-10 lines long, compressed, densely "sily-fulvous." Corolla about 1 1/2 lines in diameter; petals numerous, free, in 2 series, about 8 lines long and 1-line broad, cuneately linear, obtuse, incurved at the tips, yellow tinged with saffron at the apex above, fulvous on the back tinged with rosy-orange at the tips. Stamens about 4 lines long, erect in columnar mass, rich golden-yellow; filaments (probably the inner only) hairy at the base. Stigmas 7-9, divergent, 3 1/2 lines long, papillate on the face, yellow. Ovary slightly convex on the top. Capsule 7-11-celled. Seeds about 1/5 line long, dull reddish-brown.

Dinteranthus microspermus, Schwantes in Zeitschrift f. Sukkul-entunde, vol. II, p. 184, name only, and *Mesembryanthemum microspermum*, Dinter and Derenberg, in the same volume, p. 264, with description and figure.

Great Namaqualand; growing among white quartz stones about 12 miles south of Warmbad, Dinter.

I am indebted to Dr. F. Vaupel, the Editor of the Zeitschrift f. Sukkulantenkunde, for permission to reproduce from the latter work by means of a photograph sent to me by Mr. C. A. Maass, the accompanying illustration (Fig. 46) of this remarkable specie, which is evidently closely allied to *R. Pole Evansii*, but differs from that species by its dotted leaves and differently colored flowers, it also comes from a locality some hundreds of miles distant.

In the Zeitschrift f. Sukkulantenkunde, vol. II, p. 173, Mr. G. Schwantes has created a number of new genera belonging to this group of plants, and among them, on p. 184, is the genus above *Dinteranthus*, Schwantes, under which the above plant is placed, together with *Rimaria Pole Evansii*, N. E. Br., and *Argyroderma Margaritae*, N. E. Br. That is to say, *Dinteranthus* is a name founded upon a combination of three species which I have placed under two genera already established, and therefore is entirely inadmissible and only adds unnecessary names to the synonymy. No mention is made of characters by which *Dinteranthus* is distinguishable from *Rimaria*, and those given for *Dinteranthus* accord with those of *Rimaria*.

Of the other genera made by Mr. Schwantes I have not yet made any study, but judging from the species enumerated under them, some will undoubtedly be acknowledged as good genera, and these I note are mostly founded upon species of which (when studying all the available material in the Kew and other Herbaria three years ago in

85 search of generic characters) I had not seen specimens or had insufficient material for examination and so left for further study as material became available. But with reference to several of the genera proposed, I feel doubtful if Mr. Schwantes has examined and dissected many of the species he enumerates under the genera he has founded, for some of the species mentioned I recognise as belonging to genera I have already characterised and others I think are doubtfully separable from *Mesembryanthemum*. Unfortunately the type species upon which he founds each genus is not mentioned, but I hope Mr. Schwantes will clearly point out which species is the type of each of his genera so that future confusion may be avoided.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 81: 116. 1927.
(Continued from page 85.)

2A.--*MUIRIA*, N. E. Br.

116 Stemless, with short, fibrous roots. Growths more or less compressed-subglobose or compressed-ovoid and sometimes slightly angular from mutual pressure, with an obscure, short, slit-like orifice below the apex on the side turned towards the centre of the clump, very fleshy, velvety-puberulous with adpressed, fine hairs. Flower solitary, just exerted from the top of the growth, with the clavate pedicel included; bractless. Calyx 6-lobed down to its union with the ovary; lobes oblong, flattish, with membranous tips. Petals numerous, free, in several series, linear, the inner very narrow and filiform-linear (staminodes?). Stamens numerous, connivent-erect; filaments not hairy at the base. Glands around the top of the ovary 6-7, broad and nearly contiguous. Stigmas 6-7, short and stout, erect, or possibly finally spreading. Ovary externally appearing inferior and very large and pear-shaped, but in reality partly superior and very shallow, being partly immersed in the very stout clavate top of the pedicel, 6-7-celled; placentas on the floor of the cells. Capsule shallow, convex on the top, with the sutures between the valves raised into ridges, and with 6-7 valves and cells; valves deltoid, when expanded horizontally spreading; expanding-keels closely contiguous so as to form a stout central keel, with broad, membranous, marginal wings as long as the valves; cells open, without cell-wings or a tubercle. Seeds many in a cell; ovoid, slightly compressed, with a nipple at one end, smooth, brown.

Only one species (*M. Hortenseae*, N.E.Br., the type of this strange genus) is at present known; a native of the Little Karoo in South Africa.

I have very great pleasure in naming this remarkable genus in honour of my friend Dr. J. Muir, and the species after his daughter Hortense, in recognition of the very great assistance Dr. Muir has rendered by sending living plants to me, with valuable information concerning them, with which has enabled and will still aid me to give a much better account of many of these genera than would otherwise have been possible.

Generically, *Muiria* is more nearly allied to *Oophytum* than to any other genus, and I place it next after that genus.

1.-- *M. hortenseae*, H.B.Br. (Fig. 59).-- Growths about 3-5, crowded together into a clump, each 1-1½ inch high, 1-1½ inch broad, and ½-1 inch thick, more or less compressed-subglobose or compressed ovoid, sometimes slightly angular from mutual pressure, very obtusely rounded at the apex, with a somewhat obscure, slit-like orifice below the apex, always on the side facing towards the centre of the clump; substance very fleshy; surface smooth, velvety-pubescent, with very fine, adpressed hairs directed downwards, whitish or greyish under natural conditions, often with a rosy tint where exposed to strong sunlight, partly invested at the base with the brown, withered skins of former growths. Flowers solitary, with the thickened top of the pedicel just exerted from the burst opening of the growth, which during flowering becomes withered, wrinkled and brown. Calyx 6-lobed down to its union with the ovary, 2½-3 lines long and about 2 lines broad, oblong, obtuse, membranous at the apical part. Corolla varying from 5-12 lines in diameter, cup-shaped, opening about 10 a.m. and closing between 4 and 5 in the afternoon, sweetly-scented; petals numerous, free, in several series; the outer 4-6 lines long and ½-1 line broad, linear, obtuse or obtusely pointed, the inner smaller and narrower, with the innermost linear-filiform, (staminodes?), somewhat stiff or brush-like to the touch, pure white in some flowers, in others pink at the tips or more or less tinged with very pale pink except at the base. Stamens 2-3 lines long; anthers yellow. Stigmas 6-7, erect, probably becoming erectly-spreading, ½-1 line long, stout, acute. Ovary partly superior, shallow, conical at the top, with the cell-part immersed in the top of the stout-clavate pedicel, which is 3½-5 lines thick at that part and has the appearance of being a large inferior ovary, and is pale green. Capsule 3-3½ lines in diameter when closed, and including the obconic under part about 3 lines long, pale brown; when expanded 6-7 lines in diameter and pallid within, with yellowish-brown expanding-keels. Seeds about 1/3-line long, ovoid, smooth, brown, with a darker brown nipple.

Riversdale Division: In the Klein Karoo among quartz stones, at 1,200 to 1,400 feet above sea-level, flowering in December, Muir, 3885.

The cluster of somewhat egg-like bodies that constitute this strange plant render it one of the most remarkable among flowering plants, for it is quite unlike any other at present known. I have not seen a plant in flower, as the the plants sent to me failed to produce flowers this season, but have described the floral structure from flowers sent to me in formalin by Dr. Muir, and from information he has supplied. From which it would appear that the root-system is superficial and apparently not penetrating deeper than about 2 inches into the ground, and that in nature the growths are buried in the ground for about half their height, the portion underground being green. Dr. Muir informs me that when the plant is preparing to flower, "A hard spot is perceptible in the fleshy body and the covering epidermis gets thinner and paler. This hard spot is sharply marked off from the surrounding softer substance. The flowers burst right through the fleshy body at the same prominent part of the upper convexity. A fissured lesion or wound is formed, longitudinal at first (probably through the fissure), and then irregularly branched as pressure is exerted by the advancing flowers. The edges of this fissure are raw at first and exude moisture, just like any other tear or cut."

My drawing (Fig. 59) represents (at A), a plant with a cluster of three growths, slightly reduced, made from a living plant. B,

116 is drawn from a flower sent to me in formalin and the remains of a dried growth attached to a dried flower, which may not be quite like that of a living plant, of about natural size, C, represents a section through the flower B, enlarged diameters. D, is a magnified view of the hairs on the surface of the plant. E shows a capsule with valves expanded, natural size; and F is a longitudinal section through a closed capsule, rather larger than the natural size.

One peculiarity of this odd plant is that the orifice is always (at least, so far as my two plants testify) on the side of the growths that faces the centre of the clump, and on the native-grown specimens is rather obscure and might easily be overlooked, but after being in cultivation here for a few months is as evident as shown in my drawing. And this seems repeated in the new growths, which form inside the old ones just as they do in the genus *Conophytum*. Upon cutting open a flowering growth sent to me by Dr. Muir, I find that the flower is terminal, arising at the point of attachment of the base of the old growth on the same side as the orifice and curving with the same curvature of the growths; behind and at the base of the pedicel (which is quite bractless) arises a new growth; behind and at the base of the pedicel (which is quite bractless) arises a new growth inside the old one and, of course, invisible from outside, curving conformably with the old one, the curvature being due to the fact that the actual attachment of each growth to the rootstock is about 3-4 lines above the base of the growth on the same side as the orifice. Evidently this plant is of very slow growth and does not increase often.

N. E. Brown
(To be continued.)

Since the above was written I have received flowering growths of this plant passing into the resting stages, and on cutting one open was surprised to find that the tissue within the skin of the old growth consisted entirely of very large, loose and separate globose cells, varying from a half a line to one-and-a-half-line in diameter, each glistening like a dew-drop, having a thin, but somewhat tough cell-wall and clear, colourless watery contents. Under a microscope I noted that the outside of the wall of these cells was marked with outlines of small cells that had been in contact with it, but had now disappeared. As I had never, in any plant, seen a collection of large, loose cells of this character, I wished to ascertain their origin and purpose, and therefore sacrificed one of my non-flowering growths by cutting a piece from it to examine its structure, when I found that the whole interior is filled with these large, globose cells with all the spaces between them filled in with a connecting tissue of very small cells firmly binding them together into a fleshy substance, all of it with clear, colourless, watery contents, as the chlorophyll is only evident when highly magnified, the granules being sparsely scattered over the walls of the outer cells, a few even in the large cells, and are excessively small. From this it seems evident that when the plant prepares to go to rest in the very arid region it inhabits, the substance of the connecting tissue is first used up and seems to disappear entirely, leaving only the large cells to supply the new growth contained in the old one with moisture, or perhaps more probably, to retain moisture around it during the dry season, or until rain falls and the new growth starts developing. It is

- 116 evident that these large cells (which are botanically called idioblasts) are capable of retaining their watery contents without drying up for a long time and in a manner that I have never observed other cells or sections of tissue to do. I removed some of these large, loose cells and placed some on a piece of glass and some on a piece of paper, all isolated, and allowed them to remain uncovered in an ordinary living room. As I write they have now been exposed to the dry air of the room for over one hundred hours, and seem just as fresh, as plump, and as glistening as when I first removed them from the old growth. If they can do this when separated and in such exposed conditions it is very evident that when protected by the skin of the growth they must preserve their fluid contents for a very long time,
- 117 and probably gradually supply moisture to the young growth that they surround inside the old one. Yet, when one of these cells is burst, its watery contents dries up quickly. These large cells do not contain crystals, which is one of the functions of idioblasts, but there are also much smaller idioblasts mingled with the tissue containing bundles of needle-like crystals (raphides), which are excreta. And I have hitherto regarded all these large cells or idioblasts (which exist in most genera of this group, the familiar pellucid in a dark dots being due to them) as functioning only as excretory cell, for they frequently contain tannin or crystals and are thrown off with the dried skins or dead leaves, but from the behaviour of those of this singular plant, as above recorded, it is possible that besides that purpose they also function as special structures whereby these plants are enabled to endure and survive the long subjected. They are worth of more careful examination than I am able to give them.

N. E. Brown)

MESEMBRYANTHEMUM.

Gard. Chron. III. 81: 251. 1927.

(Continued from page 117.)

MUIRIA, N. E. Br.

- 251 Muiria hortenseae N. E. Br.-- In reference to the note at the end of my description of this very singular plant on p. 116, concerning the extraordinary ability of the large internal cells (idioblasts) when isolated and some placed on glass and some on a piece of paper to withstand the dry atmosphere of a living room without drying up, I now wish to record further, that these same cells, still upon the same pieces of glass and paper, remained under exactly the same conditions without any covering, fully exposed to the air and dust of the room for more than a week without drying up and apparently without shrinkage in volume, and were still glittering like dew-drops. The temperature of the room was about 60° to 62° Fahr. in the daytime, and about 50° Fahr. at night. On the tenth day a few cells showed signs of collapsing. On the twelfth and thirteenth days most of them were drying up, and on the fourteenth day only one cell, which was about one line in diameter, remained fully plump and glittering, all the others being partially or fully dried up! This one cell remained plump until the eighteenth day. An ordinary saucer half-filled with water was placed by the side of the cells on the second day after they were isolated, but the water had completely dried up two days before the cells were

251 drying up. This seems to be such an extraordinary conservation of cell-contents and vitality under conditions that I believe would be fatal in a very short time to the cells of most plants, that I deem the fact worthy of record.

8A.--MENTOCALYX, N. E. Br.

Perennial, stemless. Rootstock fleshy, bearing two or more growths, each, under natural conditions, with only one pair of leaves, except when making a new pair. Leaves opposite, unequal, when young erect and pressed together so as to resemble an eagle's beak; adult leaves
252 spreading, large and thick, flat and deltoid in outline on the face, one of them compressed and deeply keeled at the apical part on the back, velvety puberulous. Flowers solitary, terminal, pedicellate, without bracts. Calyx unequally 6-lobed down to the base of the ovary, and when in bud with the base of one of the two larger lobes more projecting than that of the other lobe so as to form a sort of chin to the bud. Corolla large, petals numerous, free. Stamens numerous, erect, somewhat loose; filaments not bearded. Glands 6, stoutly subulate, somewhat bristly-plumose, acute. Ovary wholly superior and 6-ribbed when in flower, becoming half-inferior when in fruit, 6-celled; placentas on the floor of the cells; ovules numerous in each cell. Capsule half-superior, obconic, convex, and with 6 gaping sutural ridges on the top, and with 6 valves and cells; valves deltoid, reflexed-spreading when expanded; expanding-keels with their basal part rising into a hump half as long as the valve, thin, parallel, minutely toothed at the edges, and their upper part adnate to the valve and then forming broad, marginal wings; cells flatly roofed with membranous, flexible cell-wings, without a tubercle at the opening. Seeds many in a cell, ovoid, pointed at one end, smooth.

The only known species and type of the genus is *M. Muiri*, N. E. Br., a native of the Klein Karoo, in South Africa.

The name is derived from the Latin, mentum, a chin, and calyx, cup or calyx, because the calyx, when in bud, has a sort of chin to it.

The affinity of this fine and very distinct genus is not very evident, but as its vegetative characters more resemble in form of the genus *Pleiospilos* than any other, I place it immediately before that genus, although its floral structure is entirely different. The manner in which the entirely superior ovary of the flower becomes half inferior when in fruit is very remarkable; I have not observed any other similar instance, either in this group of plants or in the many thousands of flowers I have dissected belonging to other orders. The somewhat chin-like base of one of the larger calyx-lobes is also unlike anything I have seen in any other member of this group of plants.

1. *M. Muiri*, N. E. Brown. (Fig. 128).-- Leaves unequal, spreading, the larger of the pair 2-2½ inches long, 14-21 lines broad at the base and narrowing from thence in a deltoid manner to a more or less acute apex, 9-12 lines thick at the base and 10-13 lines thick at the deeply-keeled apical part; the smaller leaf 1½-2 inches long and only 4-7 lines thick at the apical part, not so deeply keeled as its fellow, otherwise similar in shape; both are flat on the face, the larger one with a slight oblique twist (not represented in the figure), more or less incurved-hooked (at least when young) at the

252 apical part, the smaller leaf being neither hooked nor deeply keeled at the apex; when young, the two leaves are closed together, and then somewhat resemble the beak of an eagle in form; substance firmly fleshy; surface smooth and velvety to the touch, microscopically nuberulous, dull green, but probably of a brownish or greyish tint under natural conditions, not dotted. Flower always produced in front of the new pair of leaves. Pedicel $1\frac{1}{2}$ -2 inches long, erect, slightly compressed and somewhat 2-edged, 3-3 $\frac{1}{2}$ lines broad and 2 $\frac{1}{2}$ lines thick at the upper part, slightly tapering downwards, velvety-nuberulous, green. Calyx in bud and viewed from the side with a somewhat chin-like base in front, velvety-nuberulous; lobes ascending-spreading, the two larger 9-12 lines long and 4 $\frac{1}{2}$ -5 lines broad at the base, narrowing to an acute apex, keeled down the back and more or less concave and hooked or incurved at the apex; the four smaller lobes 5-6 $\frac{1}{2}$ lines long, ovate, obtuse, with membranous edges. Corolla $1\frac{1}{2}$ -2 inches in diameter, expanded in the daytime, more or less closed at night, and lasting 10-14 days, pleasantly fragrant; petals numerous, free, spreading, in about two series, rather lax, about 9 lines long and $\frac{1}{2}$ -line broad, linear, acute, pure white according to Dr. Muir, but in one of the living flowers seen the white was faintly tinted with pinkish-mauve, with a darker midline, and the other white without the pinkish tinge, so probably the colour varies, as it does in many species belonging to the other genera. Stamens somewhat loose, 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ lines long; filaments white; anthers milk-white. Glands of the disk blackish-green. Stigmas 6, spreading, about $\frac{1}{2}$ -line long, stoutly subulate, acute, somewhat bristly-plumose, green. Ovary in the flower entirely superior, with a broad base, becoming partly inferior in fruit. Green, with 6 stout ribs, 6-celled. Capsule as described under the genus, half inferior, about 5 lines in diameter when closed and 7 line in diameter when expanded; valves pallid within, with honey-coloured, expanding-keels; the cells, instead of being superior and entirely above the level of the base of the inner side of the calyx-lobes as they are in the ovary, are (in the capsule) inferior and entirely below the level of the inner surface of the base of the calyx-lobes, the valves alone being now above that level. Seeds less than $\frac{1}{2}$ -line long, ovoid, smooth, pallid, with a brown point.

Riversdale Division: In the Klein Karoo, among white stones, flowering in September and October, 1,200 feet above sea level, Muir 3,892.

Described from a living plant sent to me by Dr. J. Muir, this being another of the many interesting new species that he has discovered, which shows how rich South Africa must still be interesting undiscovered plants.

I do not know how this plant behaves in South Africa, but from Dr. Muir's statements about it, I imagine that the flowers become fully developed from their first appearance in about two months. With me however, the process of their development has been exceedingly slow; I first saw signs of flower-buds

253 at the end of August, 1926, but it was not until the fifth of March, 1927, that the first flower opened, being over six months in developing. Evidently this is the effect of the colder temperature of our climate, and I expect that the flower-buds appearing with the new pairs of leaves at the end of February, 1927, will develop into flowers before they are six months old, as the warmer season is now approaching (this is written on March 14, 1927). This plant appears to flower very freely, as fresh flowers are appearing on every new growth on my specimens.

My flowering plant of this species has only two growths upon it, each with one flower. The first flower was of a decided pinkish-mauve tinge and the second almost pure white. Then the first flower, however, expanded during very dull, sunless weather, while the second one had several days of bright sunshine upon it, so that it is possible that the change in the amount of light was the cause of the change in colour. My only other plant did not develop its flowers.

Fig. 128 represents at A, one of the two growths on the plant. B, a mature flower-bud nearly ready to open, showing the prominent chin-like base of one of the calyx-lobes. C, a flower as it appeared in dull weather; in bright sunshine the petals and shorter calyx-lobes are much more spreading, although the larger calyx-lobes remain in the position I have represented. D, a longitudinal section through the flower, showing its structure, enlarged slightly more than two diameters (all the other figures are of natural size). E, a longitudinal section through a ripe fruit showing that the ovary in ripening becomes half inferior. Probably this is due to the enormous shrinkage of the central watery tissue of the pedicel that takes place during the ripening. F, is a young seedling, showing the united cotyledons and the first pair of leaves, which are minutely puberulous.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 81: 430. 1927.
(Continued from page 253.)

5.--GIBBAEUM, HAW.

The following matter relating to this genus is additional to that already published in The Gardeners' Chronicle, and brings our knowledge of it up to date.

G. album var. *roseum*, N. E. Br.-- Besides the typical form with pure white flowers described in The Gardeners' Chronicle, 1926, vol. LXXIII, p. 215, fig. 105, c. and G., Dr. Muir has discovered a more robust form which has flowers varying "from pale to very deeper pink," to which the above varietal name may be given. But some plants of the same robust form have pure white flowers.

Riversdale Divison: In the Klein Karoo, Muir, 3975.

G. angulines, N.E.Br.-- Stems procumbent or decumbent, with very numerous growths or short branchlets crowded into a compact mass of a silvery or greyish colour. Each growth in nature formed of two unequal leaves united for about 3 lines at the base, with the free part of the larger leaf $\frac{1}{2}$ -1 inch long, and of the smaller leaf 4-10 lines long, 4-5 lines broad and 2-3 $\frac{1}{2}$ lines thick near the base, slightly flattened-subterete or trigonous-subterete, the larger leaf being less convex on the face than the smaller one, and its edges rather more distinct, sometimes slightly keeled on the back at the apical part, apex obtuse or bluntly pointed; surface smooth, velvety to the touch from being covered with a very minute, hoary, adpressed pubescence, the hairs pointing downwards; when at rest naturally the leaves are pressed together, but when growing

430 (at least, under cultivation with me) they diverge from the base and more or less recurve,. Flower solitary, terminal, with a new growth on each side of its base. Pedicel 6-10 lines long, 12-line thick at the upper part, slightly narrowing towards the base, angular and together with the calyx velvety-ruberulous like the leaves. Calyx subequally 6-lobed; lobes $2\frac{1}{2}$ -3 lines long and 12-14 line broad, ovate, subacute or obtuse, keeled on the back two of them with membranous margins. Corolla apparently about 8-9 lines in diameter; petals numerous, free, in about 2 series, 3-3 $\frac{1}{2}$ lines long, $1\frac{1}{2}$ -2 line broad, cuneately linear, obtuse, apparently magenta ("red" according to Dr. Muir). Stamens numerous, erect, about 1 $\frac{1}{2}$ line long, white; filaments hairy at the base. Stigmas 6, connivent erect, about $\frac{1}{2}$ -line long, subulate acute. Fruit not seen. *Mesembryanthemum angulipes*, L. Bolus in Annals of the Bolus Herb., vol. IV, p. 2 (1925).

Riversdale Division: In the Klein Karoo, at 1,000-1,300 feet above sea-level, flowering in September and October. Muir, 3898.

This interesting species at first sight is quite unlike the other known members of the genus *Gibbaeum* on account of the leaves being free for a great part of their length, and divergent when growing, but its flowers and pubescence demonstrate that it belongs to this genus. It was discovered by Dr. J. Muir in 1925 and sent to Mrs. Bolus, who described it as above-quoted, but without indicating its true affinity. Dr. Muir informs me that in South Africa "It is a silvery, often depressed, somewhat scrubby undershrub, often with decumbent or spreading branches, and grows on flats and hillsides from 1,000-1,300 feet. It occurs partly on the quartz fields and partly on the adjoining Bokkeveld shales in the Klein Karoo, flowering copiously in September and October.

From Dr. Muir's account it would appear that it attains to the height of an undershrub in South Africa; with me, however, the plant of it I received from Dr. Muir is prostrate, and only attains a height of about 2 inches above the ground. In this country also, as the growth takes place in the colder and more sunless part of the year, two or even three pairs of leaves are present at the same time on the growths, as there is no sun heat to dry up the old leaves.

G. dispar, N. E. Br. in The Gardener's Chronicle, 1926, vol. LXXIX, p. 215, Fig. 1055. -- Pedicel 1-2 lines long. Calyx subequally 6-lobed, lobes about $2\frac{1}{2}$ lines long, two of them keeled and green, the other four flat, broadly oblong and with membranous margins, rounded at the apex. Corolla 12-13 lines in diameter, fully open from 10.30 in the morning, according to Dr. Muir; petals in one series, about 5-5 $\frac{1}{2}$ lines long and $\frac{1}{2}$ -1 line broad, linear, obtuse, intense pink, with the median line very faint or absent (ex Muir). Stamens numerous, 2-2 $\frac{1}{2}$ lines long, filaments not hairy at the base, white; anthers yellow. Stigmas 6, finally $2\frac{1}{2}$ lines long, erect, filiform-subulate. Ovary flattish at the top.

This completes our present knowledge of this plant, the above description being made from flowers of the type. Muir 3797; sent to me by Dr. Muir.

G. geminum, N. E. Br. in The Gardeners' Chronicle, 1922, vol. LXXI, p. 129, Fig. 64f. and vol. LXXIX, p. 215.-- Dr. Muir informs me that this species "forms mats on carpets up to several feet in diameter, and is found most commonly on the flats in clayey soil, also often in brackish places. Less commonly in gravelly places on the shales away from the quartz fields."

G. Shandii, N.E.Br., in *The Gardeners' Chronicle*, 1922, vol. LXXI, p. 129, fig. 64. D.E., and vol. LXXIX, p. 235.-- I am now able to add a description of the flowers of this species made from dried flowers sent to me by Dr. Muir:-- Pedicel 7-8 lines long and together with the calyx minutely puberulous like the growths. Calyx subequally 6-lobed; lobes about 2 lines long, two of them keeled, the others flatter, oblong, obtuse, with narrow, membranous margins. Corolla 9-11 lines in diameter; petals in one series, about $3\frac{1}{2}$ -4 lines long and $\frac{1}{3}$ line broad, linear, apparently acute, "deep pink, with a darker median line from base to apex", ex Muir. Stamens numerous, collected into a cone $1\frac{1}{2}$ line long; filaments not hairy at the base, "of the faintest flesh colour; anthers yellow." Stigmas 6, about $\frac{1}{2}$ line long, shortly subulate, acute, greenish, connivent in the flower seen, but perhaps spreading in older flowers. Top of the ovary flattish.

Ladismith and Swellendam Divisions: In the Klein Karoo, Muir, 3815.

Dr. Muir informs me that in nature this is a smaller species than *G. pubescens*, that it "does not glitter in the sun and occurs in quite different localities usually." "*G. pubescens* is a larger, finer shrub, glittering silvery and always on the quartz field. *G. Shandii* is much smaller, drab and somewhat dirty-looking, and prefers the stony broken Bokkeveld shale areas, which are mostly dark brown. *G. pubescens* has as a background the white quartz fields which make the eyes ache. *G. Shandii* a dark ugly, stony background. You can distinguish them in a fast travelling motor without getting down." Since these two plants are so easily seen, as they form "little, mound-like clumps dotted over the country," their colour resemblance to their surroundings cannot be in any way protective, therefore there must be some other explanation of it than the one of "protective resemblance," which is usually applied to such resemblances. Can it be that there is some unknown physical action brought to bear upon the plants by the reflection of light from their surroundings that causes them to be somewhat similarly coloured? The colouration of *G. Shandii* and *G. pubescens* in my greenhouse is hardly distinguishable and much greener than in nature.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 82: 92. 1927.

(Continued from page 430, Vol. LXXXI.)

RHINEPHYLLUM, N. E. Br.

Stemless, perennial, succulents; night-flowering. Leaves opposite, in 1-2 pairs to a growth under natural conditions, but in several pairs to a growth under cultivation, thickened upwards or clavate, obtuse, flat on the face, rounded or keeled on the back, rough from being covered at the upper part with small, hard, white pimples. Flowers solitary, terminal, pedicellate, bractless. Calyx subequally 5-lobed nearly down to its union with the ovary, with the basal part hemispherical. Corolla closed during the day, expanding in the evening or at night, fragrant; petals in one series, free, scarcely longer than the calyx-lobes. Stamens numerous, erect from an incurved base, and numerous, erect from an incurved

92 base, and the inner densely bearded there. Stigmas 5, ascending-spreeding, subulate, somewhat plumose. Ovary inferior, shallow, slightly elevated at the central part on the top, and with the margin (disk) also raised, 5-celled, with the placentas on the floor of the shallow cells. Capsule small, shortly obconical, flat on the top, with the stures slightly raised and gaping, with 5 valves and cells; valves deltoid, reflexed when expanded; expanding-keels as long as the valves, contiguous into a central keel throughout, with broad membranous marginal wings that, are not united in pairs between the valves; cells open, without cell-ings or tubercles,. Seeds numerous in each cell, globose-ovoid, slightly compressed, with a nipple at one end, smooth.

Species 2, *R. Muiri* being the type of the genus; native of Karoo region of South Africa.

The name is derived from the Greek, rhine, a file and phyllon, a leaf, in allusion to the rough surface of the leaves.

In habit this genus somewhat resembles that of *Titanopsis*, Schwant., and *Psammophora* Schwant., but the structure of the flower and fruit is quite different, and more closely related to that of *Delosperma*, N.E.Br., from which it differs in habit, in flowering at night, in its firm and rough (not soft and papulose) leaves, absence of staminodes and shallower cells of the ovary.

My diagram of the floral structure (Fig. 39) is made partly from a living flower of *R. Muiri* that never fully expanded, and partly from dried flowers sent to me with the living plants by Dr. Muir.

1. *R. Muiri*, N.E.Br. (Fig. 39).-- Plant varying from $\frac{1}{2}$ - $1\frac{1}{2}$ inch in height. Rootstock stout, fleshy, producing several tufts of leaves at the top, forming a small clump. Leaves ascending or ascending-spreeding, 5-14 lines long, 2-5 lines broad and $1\frac{1}{2}$ -3 lines thick at the apical part, tapering downwards to a much smaller base, triconously clavate, obtuse or bluntly pointed, flat on the face, with sharp edges, very rounded and scarcely keeled on the back on South African plants, becoming slightly keeled (especially at the apex) under cultivation; surface glabrous, smooth on the lower half and the upper half covered with very small and slightly raised, hard, white pimples, and the edges sharply defined by a continuous, hard or cartilaginous line, the ground colour of the leaf being green or purplish. Pedicel terminal, bractless, about 6 lines long, about 1 line thick, glabrous. Calyx glabrous, dull green, tinged with purple, basal part somewhat hemispheric, but narrowing into the pedicel and about 4 lines in diameter; lobes 3- $3\frac{1}{2}$ lines long, $1\frac{1}{2}$ -2 lines

93 broad at the base, thence gradually tapering to an obtuse and slightly hooded apex. Corolla about 8-9 lines in diameter (but not seen fully open), expanding (according to Dr. Muir) after 6 p.m., and seen to be open until 1.15 a.m., but closed when inspected at 3.30 a.m., during the same night, closed during the day, fragrant; petals about 35, in one series, $2\frac{1}{2}$ -3 lines long and $\frac{1}{2}$ -line long, linear, obtuse, pale lemon yellow or white. Stamens numerous, erect from an incurved base, about $2\frac{1}{2}$ lines long, the filaments of the inner series densely bearded at the base, white, anthers pale yellow. Disk apparently entire, but could not be properly examined without destruction of the only living flower seen, yellowish-green at the margin. Stigmas 5, ascending, shorter than the stamens and about $1\frac{1}{2}$ line long, subulate and somewhat plumose, yellowish-green. Top of the ovary green. Capsule, when closed, $2\frac{1}{2}$ lines in diameter,

93 brown outside; when expanded, 4 lines in diameter and entirely ochraceous inside, otherwise as described under the genus. Seeds about 1-line long, globose-ovoid, slightly compressed, smooth, very pale brownish, with a darker point.

Iadismith and Swellendam Divisions: In various parts of the Klein Karoo, growing on the quartz-fields and on the Bokkeveld shales, at an altitude of 1,500-2,000 feet, flowering in March and October to December, not common, Muir, 3,790, 3,884, 4,023.

This very distinct little plant is another of Dr. Muir's discoveries, and he informs me that it "closely resembles the Bokkeveld shales on which it grows" so that it is probably not easily discoverable.

2.--*R. Pillansii*, N. E. Br. (Fig. 40).-- Habit exactly as in *R. Muiri*. Leaves in 2-3 pairs to a growth, ascending-spreading, 6-9 lines long, 3-5 lines broad and 2-3 lines thick at the apical part, where the leaf is dilated and much thicker than at the base, somewhat spatulately clavate, obtuse, flat on the face, with the edges very sharp and without well defined or cartilaginous edges or edges formed of contiguous white dots, rounded on the back; surface glabrous, thickly covered nearly all over with slightly prominent hard, whitish dots on a livid, slaty-green ground. Flowers and fruit not seen.

Leingsburgh Division: Near Matjesfontein, growing upon slate-coloured shales, Pillans.

This species differs from *R. Muiri* by its leaves being more abruptly dilated at the apical part, rather more obtuse, without well marked, cartilaginous edges, and by their peculiar and rather livid slaty-green colour. Mr. Pillans informed me that it so well simulated in colour the shales it grew upon as to be difficult to detect.

Fig. 40 is from a photograph of the plant sent to me by Mr. Pillans, taken by my daughter about four months after it was received.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 82: 113. 1927.
(Continued from page 93.)

ARGETA, N. E. Br.

113

A very dwarf and practically stemless succulent perennial, forming tufts or clumps of many small growths on a firmly fleshy central root-stock. Leaves opposite, united at the base, 1-2 pairs to a growth, without internodes between the pairs, short and thick, flat above, keeled on the back at the top, firm, smooth, whitish or whitish-green. Flowers solitary, terminal, but at the side of the new pair of leaves, appearing sessile, but with the short pedicel included between the bases of the old leaves, bractless. Calyx unequally 6-lobed nearly down to its union with the ovary, the two lateral lobes longer than the other four, laterally compressed, acutely keeled on the back and the keel continued downwards to a slight wing. Petals free, lax, in 1-2 series. Staminodes numerous, erect, with recurved tips, surrounding the stamens, filiform, acute. Stamens numerous, erect, in a central

- 113 column. Stigmas 6, ascending or erect, filiform, shorter than the stamens. Ovary inferior, shallow, flat at the top, 6-celled; placentas on the outer wall of the cells. Capsule shortly obconic and rather shallow, compressed below and narrowly winged on each side, six-valved, with the sutures between the valves on the top slightly raised and slightly curving; valves spreading or recurved when wetted, deltoid and as broad as long; expanding-keels contiguous at the base, then diverging.
- 114 with broad, membranous, marginal wings; cells flatly roofed with transparent, membranous, flexible cell-wings, without a tubercle at the opening. Seeds many in a cell, ovoid, pointed at one end, smooth brown.

The only known species is a native of the Klein Karoo, in South Africa.

The name is derived from the Greek, *argeta*, chalky, in allusion to the whitish colour of the plant. Although I have had it in cultivation for two years it has not flowered with me, so that I am unable to give a proper diagram of its floral structure.

A. retrensis N.E.Br. (Fig. 52).-- Clumps 2-4 inches or perhaps more in diameter, and $1-1\frac{1}{2}$ inch high. Leaves as described under the genus, ascending or diverging, mostly 2-6 but varying from 2-9 lines long, $2\frac{1}{2}-6$ lines broad and $2\frac{1}{2}-4$ lines thick, flat or slightly convex on the face, which is deltoid-ovate or triangular in outline, with sharp edges and acute or obtuse at the apex; in side view rounded at the apex, keeled on the back. Calyx rather compressed and acutely 2-edged, the two lateral lobes $2-2\frac{1}{2}$ lines long, or possibly longer when alive, laterally compressed and acutely keeled down the back, the other four smaller and $1\frac{1}{2}-2$ lines long, keeled on the back and with narrow, membranous margins, smooth, and of the same texture and colour as the leaves. Corolla about 9-12 lines in diameter; petals about 30, in 1-2 series, lax, 4-5 lines long and $1/3-1$ line broad, linear, obtuse at the apex, reddish according to Dr. Muir, but appearing to be of a rich rosy colour in the dried flowers seen. Stamens erect, $1\frac{1}{2}$ line long; filaments not bearded, surrounded by erect filiform staminodes, which are longer than the stamens and recurved at the tips. Stigmas 6, erect, 1 line long, filiform, greenish (?). Ovary flat at the top. Capsule as described under the genus, $2\frac{1}{2}$ lines in diameter when closed, and about $4\frac{1}{2}$ lines in diameter when expanded; valves cream-coloured inside; expanding-keels dark orange-brown; marginal wings colourless. Seeds about $1/3$ line long, smooth, brown.

Riversdale Division: On hills in the Klein Karoo, growing among white stones, on Bokkaveld Shales at an altitude of 1200 feet Muir 3622 feet.

Described from living plants and dried flowers supplied to me by Dr. J. Muir, who first discovered it, and who informs me that this neat looking little plant grows among white quartz stones that are blinding in the glare of the sun and conforms so closely in general appearance to the stones it grows among that its presence is not easily detected until the eye has analysed its surroundings and discovered that plants as well as stones are present on the ground, and when that is once realised the person finds that he "has been walking over and upon the plants at every step, and becomes astonished at two things; firstly, that he has not noticed the plants at first, and secondly that he had noticed them at all." Under cultivation with me, this plant has become much greener than when first received.

114 Fig. 52 is from a photograph of the plant as it grows in South Africa, about two-thirds its actual size, taken by Mr. R. A. Dyer, to whom I am indebted for permission to make use of it.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 82: 228. 1927.

(Continued from page 92.)

[114.]

CONOPHYTUM.

228 *Conophytum elegans*, N. E. Br.-- This name must replace that of *Lithops marlothii*, N. E. Br. in The Gardeners' Chronicle, 1926, Vol. LXXIX, p. 102, f. 52, for having now flowered with Mr. T. Endean (who has very kindly sent his plant for me to see), it proves to be a *Conophytum*. When first sent to me, the flat top, its curious, window-like structure and the fissure right across it was so like that of *Lithops* that I fell into the error of placing it in that genus. The flower, however, is that of a *Conophytum*; it is 8-9 lines in diameter, pure white, with a ring of scale-like yellow staminodes at the mouth of the 4-line long tube. The stamens are seated low down in the tube, but above the stigmas. The flower opens only in bright sunshine and is not scented. Another synonym of this plant is *Opethalmophyllum marlothii*, Schwantes in Moller's Deutsch Gart. Zeit., 1927, p. 64. The specific name *marlothii* cannot be retained for it, as that name has already been used for a *Conophytum*.

C. frutescens, Schwantes in Mollers' Deutsch Gart. Zeit., 1927, p. 123, is a synonym of *C. cauliferum*, N. E. Br. The differences mentioned by Schwantes to separate them are only non-specific individual features.

CLERETUM, N. E. Br.

This genus was published in The Gardeners' Chronicle, 1925, Vol. LXXVIII, p. 412, but has recently been redescribed under the synonymic name of *Dorotheanthus* by Schwantes in Moller's Deutsch Gart. Zeit., 1927, p. 263. The species are: *C. apetalum*, N. E. Br. (*Mesembryanthemum apetalum*, L.); *C. criniflorum*, N. E. Br. (*M. criniflorum*, L. *Dorotheanthus criniflorus*, Schwant)--this is the type of the genus *Cleretum*; *C. gramineum* N. E. Br. (*M. gramineum*, Haw., *Dorotheanthus gramineus*, Schwant.); *C. papulosum*, N. E. Br., (*M. papulosum*, L.); *C. pinnatifidum*, N. E. Br. (*M. pinnatifidum*, L. f.); *C. puberulum*, N. E. Br. (*M. puberulum*, Haw.).

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 82: 263. 1927.

(Continued from page 228.)

FENESTRARIA, N. E. Br.

As the two species of this genus can scarcely be distinguished by their leaves, and as they have now both flowered in Europe, the following brief descriptions of their flowers may be useful for discriminating them until more complete descriptions can be given at a later date.

F. aurantiaca, N. E. Br.-- Corolla $2\frac{1}{2}$ -3 inches in diameter; petals about 5, in one series, 12-15 lines long, and 1 line broad, obtuse, of a somewhat orange-yellow with a pinkish tinge on the back; shining. Stigmas very plumose, white.

This beautiful species is the type of the genus.

F. rhopalophylla N. E. Br.-- Corolla $1\frac{1}{2}$ -1. inch in diameter; petals about 35, in one series, 8-9 lines long, $\frac{1}{2}$ -1 line broad, obtusely pointed, white. Stigmas filiform, acute, not plumose, pale yellowish-green.-- *Mesembryanthemum rhopalophyllum*, Schlecht and Diels in Schultze, Aus Namaland und Kalahari p. 83, with fig. and p. 692; Harloth, Flora of South Africa, Vol. 1, p. 207, t. 52.

Both species are natives of Namaqualand.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 82: 290. 1927.
(Continued from p. 263.)

12.--GLOTTIPHYLLUM, HAW.

Very dwarf succulent perennials branching close to the ground. Leaves 4 or more to a branch or division of the plant, opposite; crowded or very closely placed, usually three to several times as long as broad, but in a few species occasionally not much longer than broad under natural conditions, those of each pair subequal or unequal in size, and usually with the terminal part of one leaf different in shape from that of the leaf opposed to it, either arranged in two rows or the alternating pairs crossing one another; thick, soft and pulpy in substance, green, rarely whitish-green or brownish tinted, without dots, or in some species pellucid-dotted.

Flowers solitary (see Fig. 111, showing structure) lateral, large, bractless. Calyx 4 (in one doubtful species, 5)-lobed down to its union with the ovary, often angular. Petals numerous, free or slightly united at the base, cuneately linear. Stamens numerous, erect, no staminodes. Stigmas 7-11, radiating or ascending, stout, plumose; style none. Ovary partly superior, convex or flattish on the top, 7-11 celled; placentas down the centre of the outer wall of the cells.

Capsule convex or flattish-convex on the top, with 7-11 valves and cells; each valve with a pair of expanding keels half as long as itself, ending in fine, awn-like points, without marginal wings; cells roofed with rigid cell-wings and their opening nearly closed by a large tubercle. Seeds small, ovoid, with a small nipple at one end.-- Haworth, Adv. Fl. Succ., p. 108 (1821), and A. E. Brown in The Gardeners' Chronicle, 1921, Vol. LXX, p. 311.

Species 26 or more, so far as known all natives of the southernmost part of Southern Africa, between Cape and Albany divisions, extending inland so far north as Prince Albert division. The type

290 species is *G. linguiforme*, N. E. Br. (syn. *Mesembryanthemum linguiforme*, L., and *M. scalpratum*, Haw.)

The name is derived from the Greek *glottis*, a tongue, and *phyllon*, a leaf, in allusion to the long, tongue-shaped leaves of several of the species.

I believe that the species of this fine genus are not particularly sought after by those who are interested in this group of plant, because it so often happens that those that are obtainable, although provided with many different names, are found to be so much alike as to evoke but little interest from the cultivator. I think there are three reasons for this, as follows:-- (1) Those who are able to name these plants from books, usually use Salm Dyck's fine figures for that purpose, but as I have repeatedly stated, the names therein given are often very untrustworthy, as it seems that the names in that work are usually accepted as correct without the slightest investigation of their authenticity, plants named by means of those fine figures are very frequently wrongly determined, and as the same species is sometimes figured in the work

291 under two or three names, it is easy to understand how different persons naming the same plant from that book may impose different names upon it. (2) Heworth, apparently unaware of the variability of these plants, described mere forms of one plant as distinct species. (3) There are, in reality, a number of perfectly distinct species of this genus in South Africa, many of which have been introduced into cultivation and described and figured. Most of them increase slowly by branching and therefore are more seldom propagated by that means than they are by seeds, and it is by means of seeds that many (perhaps most) of the cultivated plants are distributed. Now, as many of them plants require to be cross-fertilised to produce seeds, and as it would often happen that only one plant of a given species (especially if it is uncommon) would be in any particular collection, it is easy to understand that hybridisation would frequently occur. So that it appears to me that what has happened is this: the original species died out of cultivation, but plants raised from seeds produced by it survived, but were really hybrids, and these again and again producing seeds by hybridisation to which the same name or names have been given, have resulted in a lot of hybrids, similar in appearance but bearing different names, being distributed among cultivators at the present day. It is now quite difficult, if not impossible, to obtain several of the original species true to name from cultivators in this country or on the continent. For example., I find cultivated in Low Gardens the following species of *Glottiphyllum* that have been received from various collections in this country and on the continent under the following names as species of *Mesembryanthemum*:-- *G. longum* has been received under the names of *M. lucidum*, *M. bigibberatum* and *M. Salmii* and *G. latum* has been received under the names of *M. bigibberatum*, *M. angustum* var. *heterophyllum*, and *M. longum* var. *declive*.

Those which I believe to be hybrid forms appear to me to be hardier than some of the true South African species, of which I possess about fourteen distinct kinds, some of which are rather delicate, requiring careful treatment under cultivation.

An account of all the known species was given by me in *The Gardeners' Chronicle*, 1921, Vol. LXXX, p. 327 and 336, and 1922, Vol. LXXII, p. 9 and 22. Since that time, however, I have received some new and old species from Mrs. Bolus, Mrs. Van der Bijl, Dr. Harloth and Dr. Muir, and with the aid of these I have restudied

291 the described species afresh, and although in the main my conclusions remain the same with regard to synonymy, I have made some important modifications in consequence of the greater amount of living material I have been able to examine, and more especially on account of some very important information I have received from Dr. J. Muir concerning these plants.

Dr. Muir has made the very interesting discovery that under natural conditions some (perhaps most) of the species exist in two different forms that are connected with each other by a series of intermediate forms, so that although the two ends of the series are very different in general appearance they cannot be distinguished as distinct varieties. Dr. Muir states: "At one end of the series is a harder, smaller and darker green plant, often with some tinge of brown or red, with less juice; at the other a lighter green, softer and much larger form. They may both equally well bear flowers, and the smaller form seems a complete example therefore. In the same locality both may be found, the smaller, harder type in more exposed and on shallower soil, for example, on a flat rock or where there is less moisture. The softer, juicier form further away, under the shelter of a shrub, in deeper soil or where moisture is retained longer. Sometimes the harder, smaller form seem merely younger. In cultivation (in South Africa) the harder form gradually, even after a year or two years, seems to change into the other form. But the harder form is more resistant to climatic changes; for example, frost congeals the juices of the softer form, which dies, whilst the harder form survives (see also a note under *G. latum*). The bevelled and hooks at the ends of the leaves of some species exist in miniature in the harder form and are therefore often not so noticeable as in the more juicy forms. My specimens of *G. Muirii*, of which I had both extreme forms, and of which the smaller and harder form had remained as such since 1924, has now (June 1926) during the past few weeks undergone a change and become greener and juicier and are quickly assuming the other form.

An illustration of these two extreme forms is given in Fig. 132, reproduced from *The Gardeners' Chronicle*, 1921, Vol. LXX, p. 327, where I thought the plant might be *G. rustulatum*, which I had not then seen, but now that I know that species, I find it is distinct and I have named the plant figured *G. erectum*. I there called attention to the remarkable difference between the plants represented growing together in the same pot and raised from seeds taken from the same seed-pod, but did not then understand the significance of it. Dr. Muir's discovery throws light upon it, but does not completely explain the reason for it. At the present time both the plants represented in Fig. 132 are indistinguishable from one another. Did one of the plants obtain most of the water supplied to that pot at the expense of the other plant and so partly starve the latter, or is there some other explanation? At any rate, Dr. Muir's discovery clearly supports the view it will be found I have taken under *G. latum*, that all the figures of *Calam Lyck's* that I have quoted under the species that its variety *cultratum* represent only individual forms of one and the same species, especially as it is confirmed by the fact that in my own green house one plant of *G. latum* is actually transforming itself into the variety *cultratum*, but whether it will permanently retain the curvature of its leaves, by which alone that variety is distinguished from typical *G. latum*, remains to be seen.

Dr. Muir believes (and in this I quite agree with him) that the early botanists, who did not know of this variation, were misled

291 into mistaking the various forms a single species may assume for distinct species, and adds in a letter: "The whole question of this variation seems regulated by laws acting consistently and regularly, and the different forms do not occur with the bewildering arbitrariness which must appear to exist to one in Europe".

That the variation of the species of this genus under natural conditions has caused and will still cause difficulty in recognizing whether any given plant imported into Europe is a distinct species or a variety of another is very evident and certain.

Even during the past year I have been utterly deceived in the case of plants received from Dr. Muir of *G. fragrans* and *G. pustulatus*, whose leaves were so different from those of the plants known to me by these names that I at first made descriptions of them as being new species, and am quite sure that any other botanist or cultivator who had no knowledge of the variation extant in these species would have likewise considered them to be distinct, I therefore direct the notice of cultivators to the sketches of the leaf variations (to appear later) I have made under these two species and call attention to the notes made under those and other species.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUL.

Gard. Chron. III. 82: 348. 1927.
(Continued from page 291)

348 I am of opinion that this genus has been much neglected by collectors in South Africa. It is very probable that several more species remain to be discovered, and as the localities of most of the old species are unknown, it is desirable that they should be rediscovered and their natural habitat made known, as well as information obtained as to the amount of variation that exists among the different species in their native habitats.

According to information received from Dr. Muir, the species of *Glottiphyllum* grow in: "all sorts of places; among gravel, stones, under shrubs and in the open, on thin soil covering rock-slabs and in deeper soil, rarely in rock-crevices." Under cultivation, I find that several species will endure great drought well.

The determination of the species of this genus from descriptions alone is a very difficult matter, therefore, to aid cultivators to identify them, I have made and added sketches of the leaf-tips of most of the species, from living plants, where possible, the tips of both leaves of a pair being represented, as I find that the character of the leaf-tip taken in conjunction with that of the flower very satisfactory for identification purposes; and it is hope that used in conjunction with the key to the species, these sketches will enable cultivators to correctly determine most of them, but the descriptions should be consulted as well. Hybrid forms, of course, cannot be named by their use. Further, I would also point out that as most of the figures and descriptions are made from plants cultivated in Europe, they may not quite coincide with native South African specimens as, for example, I have been able to indicate in the case of *G. fragrans*, where it will be seen that the small ovate leaves of a native-grown plant are utterly different from that of the cultivated flowering plant

342 that will also be figured; yet under cultivation the leaves gradually pass from the simple ovate form into the other forms. With reference to the names of these plant I would again repeat that where determinations are made by means of the very fine figures of Calm Dyck's work on Mesembryanthemum and the erroneous names he has applied to those figures-- accepted as being correct without investigation (as all monographers have hitherto accepted them), confused nomenclature will certainly be maintained.

As the synonymy of this genus is exceedingly complicated I give at the end a synonymic index for the purpose of reference.

In the diagrammatic illustration of the generic structure (given on p. 290) the top of the ovary is represented as but very slightly depressed at the centre. The amount of depression, however, varies with the species, for in some species the stigmas are inserted at the bottom of a deep, cup-like depression in the top of the ovary.

Most of not all of the species of this genus are very minutely ciliate on the edges and keel of the young leaves, a character so common that of the young leaves, a character so common that I have not mentioned it in all the descriptions. The epidermis of the leaves of many species has a somewhat remarkable surface. To the naked eye and to the touch the leaf seems to be very smooth and is often shining, but if examined with a strong pocket-lens, with light falling upon it in a certain way, the surface-cell (or many of them) will be found to be raised and linear or oblong and arranged in rows transverse to the leaf. In some species, however, such as in *G. linguiforme*, the surface-cells are not at all raised in that way, but are even all over the surface. I am aware that this does not give full detail of the surface-cell structure, but it will suffice to make my meaning clear to the average cultivator armed only with an ordinary pocket-lens.

Several species in an adult state have their growths pressed upon the ground, with the leaves edgewise to the sky, but in the younger stages, or when not fully exposed to the sun in the open air, the leaves are generally more or less ascending so that this character cannot be relied upon as being always of specific value.

In my former account of this genus I gave the date of Heworth's Observations on the Genus Mesembryanthemum as being 1794; that is the date on the title-page, but I find that the book was issued in two parts, the second part, which contains all the descriptions, being dated 1795, as hereafter quoted.

KEY TO THE SPECIES.

This key to this very difficult genus is the best I have been able to construct from the material available, and may not always prove satisfactory, as I find that the same plant sometimes varies considerably from year to year, and I have not been able to provide for all variations, as some species are very versatile; but would here not that the hook at the end of the leaf is sometimes absent from leaves of species that normally possess it, and the pustule at the base of the leaves of certain species sometimes disappears from starved plants; and also in some species the leaves may now be in two ranks, and at another time the pairs obliquely cross one another.

1. Flowers with distinct pedicels $1\frac{1}{4}$ - $2\frac{1}{2}$ inches long.

2

Flowers sessile or subsessile, i.e., with pedicels not rising above the leaf-sheaths or not more than 1-2

2. Leaves with two teeth or a slight hump on the flat face, and not more than 3-4 lines broad at the middle. 3

Leaves without teeth or a hump on the flat face, but often with an oblique or slightly hooded ridge or hook at the end or the flat or concave face. 4

3. Pedicels quadrangular, 3-4 lines long. 2, difforme

349 Pedicels terete or 2-edged, 6-12 lines long. 3, semicylindricum

4. Leaves 2-3 lines broad at the middle and the leaf-pairs crossing one another at right-angles; pedicels $1\frac{1}{2}$ - $2\frac{1}{2}$ inches long; calyx 5-lobes (in all other species 4-lobed). 27, ochraceum

Leaves mostly 3-6 (but sometimes up to 7) lines broad at the middle, broader at the base, and, except in 10, *G. ariculatum*, pellucid-dotted as seen when held against the light, and the leaf-pairs more or less obliquely crossing one another. 5

Leaves 6-12 lines broad at the middle and usually arranged in two ranks (except in 5, *G. cruciatum* and 23, *G. suave*, but sometimes even on the same individual the pairs more or less obliquely cross one another and except in 5, *G. cruciatum*, not pellucid-dotted. 9

5. Leaves, mostly 3-5 inches long, ascending except when old, and of nearly the same breadth throughout, or tapering at the upper part, the larger of each pair slightly concave on the face; pedicel 9 inches long; corolla $2-2\frac{1}{2}$ inches in diameter. 11, concavum

Leaves $2-3\frac{1}{2}$ inches long, one leaf of a pair usually more or less recurved and the other erect, incurved or spreading, tapering from the base or at the upper part to an acute or blunt point. 6

6. Petals subacute or obtusely pointed, entire. 7

Petals obtuse and minutely denticulate at the apex. 8

7. Apex of the larger leaf compressed into an acute edge or keeled; pedicel $1-1\frac{1}{2}$ inch long and 2 inches thick. 6, longipes

Apex of the larger leaf beyond the flat face compressed obtusely keeled and bluntly pointed; pedicel very stout, 9-10 lines long and 3 lines or more thick; stigmas 8-9. 5, cruciatum

8. Apex of the larger leaf beyond the flat face compressed-subterete, obtusely keeled and bluntly pointed, somewhat nose-like; pedicel about 5-7 lines long and 2 lines

thick; stigmas 10.

4, subditum

Leaves tapering to a subacute apex tipped with a short reddish point or mucro; pedicel 6 lines long, 2 lines long, 2 lines thick; stigmas 8. 10, apiculatum

9. (From 4; leaves 6-12 lines broad at the middle.)
Leaves with a pustule or swelling at the base on the upper side that is usually of a paler colour than the rest of the leaf, but is at times indistinct. 10

Leaves without a pustule or swelling at the base. 11

10. Growths and leaves erect or ascending; leaves $2\frac{1}{2}$ -5 inches long, strap-shaped, narrowing at the upper part to an acute or obtuse apex that is tipped (at least when young) with a central, short point or mucro; pedicel $1\frac{1}{2}$ inch long and $\frac{1}{4}$ line thick; corolla 2-2 $\frac{1}{2}$ lines in diameter; petals obtusely pointed, entire; stigmas 8. 17, erectum

Growths and leaves ascending or more or less depressed towards the ground; leaves strap-shaped, very obtuse and with or without a small point at the end of the upper edge, or occasionally slightly hooked or obliquely pointed at the apex; pedicels $1\frac{1}{2}$ -1 $\frac{1}{2}$ inch long, 3 lines thick; corolla 2-2 $\frac{1}{2}$ inches in diameter; petals acute; stigmas 10-11. 16, longum

Growths decumbent or prostrate; leaves directed forwards and downwards, the larger leaf of each pair with a very large incurved hook at the apex and with an elevated ridge along one margin of the concave face; pedicels 3-7 lines long, 3-3 $\frac{1}{2}$ lines thick; corolla about 2 $\frac{1}{2}$ inches in diameter; petals obtuse; stigmas 8-9. 16, longum var. hamatum

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.
Gard. Chron. III. 82: 369. 1927.
(Continued from page 349.)

KEY TO THE SPECIES.

11. Leaves tapering to an obtuse point at the apex and the pairs more or less obliquely crossing one another, pellucid-dotted as viewed against the light; pedicel very stout, 9-10 lines long and 3 lines or more thick; stigmas 8-9. 5, cruciatum

Leaves tapering to an obtuse or subacute apex, the pairs in two ranks or set slightly oblique to another, very indistinctly pellucid-dotted, one of each pair slightly concave on the face; pedicel 9 lines long; corolla 2-2 $\frac{1}{2}$ inches in diameter. 11, concavum

Leaves obliquely obtuse, broadly rounded or subtruncate at the apex, with or without a small point or mucro at the end of the upper edge, usually arranged in two ranks, not conspicuously pellucid-dotted.

12

12. The larger leaf of each pair shortly incurved-hooked or slightly hooded at the apex; pedicel 6-9 lines long; corolla 2 inches in diameter; petals acute; stigmas 10.

14, uncatum

The larger leaf of each pair not incurved-hooked at the apex, all leaves widely spreading, straight or more or less curved or bent down towards the ground, $1\frac{1}{2}$ -4 inches long, strap-shaped; pedicels 3-9 lines long; corolla $1\frac{1}{2}$ -2 $\frac{1}{2}$ inches in diameter; petals acute; stigmas 9-10.

21, latum and vars.

Leaves not widely spreading, more or less directed forwards, with the pairs obliquely crossing one another, $1\frac{1}{2}$ -2 inches (or perhaps more) long, 8-12 lines broad, usually with parallel sides; pedicels 9-6 lines long; corolla 2 $\frac{1}{2}$ -3 inches in diameter; fragrant; petals somewhat acute or obtuse, entire; stigmas 8.

23, suave

Flowers sessile or subsessile. To the end of Key.

13. Leaves 3-6 lines broad at the middle, but often broader at the base; leaf-pairs obliquely crossing one another.

14

Leaves 6-18 lines broad at the middle.

16

14. Leaves with a pustule or pallid spot at their base on the upper side, gradually tapering from the base to an acute apex; petals obtuse and minutely toothed at the apex; stigmas 8.

7, Salmii

Leaves without a pustule or pallid spot at their base.

16

15. Leaves subterete and slightly flattened on the face or semiterete, 2-3 inches long, erect or ascending and curved; corolla 2-3 inches in diameter; petals very obtuse and notched at the apex; stigmas 7-8.

1, arrectum

Leaves semiterete, 3-4 inches long; corolla 3-4 $\frac{1}{2}$ inches in diameter; petals united at the base for about a quarter-of-an-inch and up to 2 lines broad; stigmas 10.

12, angustum

Leaves tapering from the base or narrowing from above the middle to an acute or subobtuse apex, which is tipped with a short whitish or reddish point or mucro, and the pairs obliquely crossing one another, pellucid-dotted; keels of the calyx-lobes minutely ciliate; stigmas 8-10.

9, praepingue

16. (From 13; leaves 6-18 lines broad at the middle; to end of key). Leaves with a pustule or pallid spot at the base on the upper side; petals obtuse and minutely

Leaves without a pustule or mark at their base on the upper side.

17. Leaves tapering from the base to an acute apoint, and the pairs more or less crossing one another; corolla $2\frac{1}{2}$ inches in diameter; stigmas 8. 7, Salmii

Leaves strap-shaped, with parallel sides and an inch or more broad, arranged in two ranks; corolla 3-4 inches in diameter; stigmas 9. 18, grandiflorum

18. Leaf-pairs obliquely crossing one another, $1\frac{1}{2}$ - $3\frac{1}{4}$ inches long and 5-9 lines broad, yellowish-green or light green, pellucid-dotted; stigmas 8-10. 19

Leaves arranged more or less in two ranks and except in 8, G. Karlothii, grass-green and not pellucid-dotted. 20

19. Leaves tapering to the apex and all of some of them tipped with a short whitish or reddish point or mucro. 9, praepingue

Leaves not tapering to the apex nor tipped with a short point or mucro; stigmas 8-2. 13, taurinum

Leaves very obtuse or obliquely rounded at the apex, sometimes with a minute point at the end of the straight or slightly hooked upper edge; stigmas 6-8. 20, cornosum.

20. Leaves upcurved and one or both of a pair distinctly hooked edgeways or by a slight twist at the apex (see also 22, G. depressum, in which the leaves are sometimes hooked at the tips); stigmas 8-9. 21

Leaves obtuse or rounded and not or but slightly upcurved edgeways and not forming a distinct hooke at the apex, but with or without a small point or mucro at the end of the upper edge; stigmas 7-8. 22

21. Leaves strongly upcurved-hooked edgeways at the apex and the large hook acute or sometimes obliquely truncate, $3-4\frac{1}{2}$ inches long and 10-12 lines broad, the larger leaf of each pair with an impression of the smaller leaf upon it, forming a ridge along the margin at the middle part and an oblique ridge below the apex; corolla $3-3\frac{1}{4}$ inches in diameter; petals obtuse and usually minutely toothed; stigmas 8. 19, Muirii

Leaves uncurved edgeways or by a slight twist and slightly hooked at the apex, $2\frac{1}{2}$ -4 inches long and 6-7 lines broad at the middle, directed forwards and more or less deflexed, without a ridge along the margin at on the face; corolla $2\frac{1}{2}$ inches in diameter; petals obtusely pointed or notched at the apex; stigmas 9. 15, proclive

22. Leaves, in summer, opaque greyish-green or chalky green,

prettily tinged with rosy or purplish when fully exposed to the sun, or becoming green in winter under cultivation in England, $2-2\frac{1}{2}$ inches long, 8-18 lines broad, sub-truncate or broadly rounded at the apex. 26, Neillii

Leaves always grass-green or light green and more or less shining. 23

23. Leaves pellucid-dotted when held against the light, mostly 2-4 inches long and 8-10 lines broad at the middle, somewhat narrowing upwards to an obtuse and often obliquely mucronate apex; stigmas 7 (or 7-9). 8, Marlothii

Leaves not pellucid-dotted, $\frac{1}{2}$ -3 inches long; corolla $2\frac{1}{2}$ -3 $\frac{1}{2}$ inches in diameter; stigmas 6-10. 24

24. Leaves tongue-shaped, 14-18 lines broad, with the upper edge cartilaginous and very acute like the edge of a knife; surface - cells even, not raised; stigmas 10-11. 24, linguiforme

Leaves variable, 6-14 lines broad, not cartilaginous nor like a knife edge at the edges; surface with transverse rows of raised linear epidermal-cells as seen under a strong lens, stigmas 6-10. 25

25. Leaves very variable, ovate to tongue- or broadly strap-shaped, 6-14 lines broad; petals obtuse and minutely toothed at the apex; flowers very fragrant; stigmas 8-10; capsule with 8-10 gaping ridges on the top. 25, fragrans

Leaves strap-shaped, 8-13 lines broad, and of nearly equal breadth throughout. 26

26. Leaves very spreading, apparently 7-8 lines broad and not very thick, slightly curved upwards edgeways at the tips, and with a short point directed forwards at the apex of the upper edge; stigmas 10; capsule with 10 gaping ridges on the top; flowers opening only in bright sunshine 22, depressum

Leaves directed forwards, 8-12 lines broad and 3-6 lines thick, apex variable; stigmas 8; flowers opening in sunless or sunny weather. 23, suave

Leaves 8-13 lines broad, thick and soft, very convex on the back, very obtusely rounded at the apex, not upcurved edgeways, and with or without a short point directed and forwards on the upper edge at the apex; flowers slightly scented; stigmas 6-8; capsule convex without any ridges on the top. 20, carnosum

N. E. Brown
(To be continued.)

390

1. *G. arrectum*, N. E. Br., in The Gardeners' Chronicle, 1922, Vol. LXXXI, p. 9, Fig. 5. (Figs. 178 and 179).-- Leaves 2-3 (rarely 4) pairs to a growth, with the pairs crossing one another obliquely, suberect or ascending-spreading, usually more or less curved, 1-2 inches long, $3\frac{1}{2}$ -5 lines broad near the base and 3-4 lines thick, more or less flattened on the upper or inner face, or semiterete, or more or less trigonous, usually without but sometimes with a keel on the back, acute or subobtuse, smooth, glabrous, light green, not at all glaucous nor dotted. Flowers subsessile or on pedicels 1-2 lines long and $1\frac{1}{2}$ line thick. Calyx 4-lobed; lobes 3-4 $\frac{1}{2}$ lines long and as much in breadth, broadly ovate, obtuse, all with membranous margins. Corolla 2-3 inches in diameter, sun-colored, spreading in sunshine, scentless; petals about 50, in one series, lax, 12-16 lines long, about 1 line broad, linear, very obtuse or subtruncate and notched at the apex, bright yellow on both sides. Stamens erectly spreading in a ring; filaments pale yellow; anthers darker yellow. Stigmas 6-8, widely spreading, about 2 lines long, plumose, acute, pale yellowish-green. Capsule sub-globose, with a high dome-like top, 3-5 lines in diameter, with 7-8 valves and cells.

Swellendam Division: At Sevenfontein, Pole Evans, 6,922, Ladismith Division: Near Adams Kraal, 1,400 feet above sea level, Muir 3,904, and near Plathuis, Muir 3,909.

Fig. 178 is from a photograph taken in South Africa by Dr. Pole Evans of the plant sent to me as it grew there, and Fig. 179 (reproduced from The Gardeners' Chronicle, Vol. LXXXI, p. 9) represents the very same plant after I had cultivated it for several months, from a photograph taken by my daughter. These two figures well illustrate the difference that sometimes occurs between these plants as they are seen in a state of rest under natural conditions and as they are seen in this country under cultivation.

2. *G. difforme*, N. E. Br., in The Gardeners' Chronicle, 1922, Vol. LXXXI, p. 22.-- Growth or branches more or less decumbent, with about 3 pairs of leaves to each and the pairs obliquely crossing one another. Leaves mostly 1 $\frac{1}{2}$ -3 inches long, sometimes longer, 1-1 inch broad, semiterete, flat or slightly concave on the face, very convex on the back, and usually with, but sometimes without, a bump or tooth on each margin above the middle, the longer leaf of each pair with the apex produced beyond the flat face into a compressed acute or blunt point, and the smaller leaf simply acute or obtuse, deep green, pellucid-dotted; according to Heworth, some of the leaves have a slight twist from above the middle, and some of them are tipped with a soft, straight, curved or hooked bristle or arculus. Pedicel very short, 4-angled thickened upwards and indistinguishably passing into the calyx-tube, which together with the pedicel is represented in the figures as about 9-12 lines long. Calyx irregularly 4-angled, 4-lobed, the larger lobes sharply keeled, the smaller membranous. Corolla 2-2 $\frac{1}{2}$ inches in diameter; petals lax, in about 1 series, 9-10 lines long, $\frac{1}{2}$ -2/3 line long, yellow.

Mesembryanthemum difforme, Linn. Sp. Pl., ed. 1, p. 487, partly as to *M. foliis difformibus*, Dillen. Hort. Eith. p. 255, t. 194, f. 242 (not 241), and Haw. Obs., p. 169 (1795) not of Salw Dyck nor

South Africa: Locality unknown, in cultivation before 1732, according to Aiton.

This species is unknown to me, and the above description is compiled partly from Haworth's original description of it, and partly from the Dillenian figure, and an original drawing of the plant in the Kew collection.

It seems to be similar to *G. semicylindricum*, but distinctly differs by its short 4-angled pedicel.

The two figures in Dillenius, Hortus Elthæ mensis, t. 194, mentioned above, were considered by Linnaeus to represent one species, but Haworth retained the name *M. difforme* for Fig. 240, and gave the name *M. semicylindricum* to the plant represented at Fig. 241, which distinctly differs by its more terete and longer pedicels. The plant figured by Salm Dyck as *M. difforme* I now find is merely a form of *G. semicylindricum* and not a distinct species as in my former account of this species I was inclined to suppose.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 82: 409. 1927.

(Continued from page 390)

12--GLOTTIPHYLLUM, HAW.

3. *G. semicylindricum*, N. E. Br., in The Gardeners' Chronicle, 1922, Vol. LXXII, p. 22 (Fig. 190).-- Leaf-pairs obliquely crossing one another. Leaves very variable, 1-2 (or under cultivation sometimes up to 4) inches long, $2\frac{1}{2}$ -4 lines broad and nearly as thick, half-cylindric, bearing on the flat face beyond the middle two blunt teeth or a transverse hump or ridge across the leaf, the apical part compressed and bluntly pointed or more or less thickened at the tip, light green, soft and pulpy, pellucid-dotted. Pedicels $\frac{1}{2}$ -1 inch long, compressed-terete, 2-edged. Corolla $1\frac{1}{2}$ -1 $\frac{3}{4}$ inch in diameter; petals acute or minutely toothed at the apex, and according to drawings at Kew more numerous and more crowded than those of *M. difforme*. Stigmas, valves and cells of the capsule 8. Capsule (of which about 20 examples have been examined) varying on the same individual from 4-7 lines, and on another plant up to 8 lines in diameter when closed, always with 8 valves and cells, somewhat cup-shaped-conic, slightly 8-ribbed on the outside, and flattish with 8 slight, gaping ridges on the top, whitish-brown; when expanded 9-14 lines in diameter; valves spreading horizontally, pale brown; expanding keels half as long as the valves, ending abruptly, without an awn or membrane at the tip, light or dark brown; cells deep; cell-wings brownish; tubercles pale brown or whitish. Seeds 2-line long, somewhat D-shaped, like a segment of an Orange, tuberculate on the back but not on the sides, brown.

Mesembryanthemum semicylindricum, Haw. Obs., p. 22 (1795), Disc Nat. p. 86, syn. Pl. Succ., p. 225, and Rev. Pl. Succ. p. 103; Salm Dyck, Mes. § 7, f. 2; Berger, Mes. und Port. p. 232. Founded upon *M. foliis difformeibus*, Dillen. Hort Elth, p. 252, t. 194, f. 241, which is a reduced figure of the plant. Plukenet, Almagestum, t. 325, f. 4, *M. difforme*, Linn. Sp. Pl., ed. 1, p. 487 partly; Salm Dyck, Mes. § 7, f. 2; Berger, Mes. und Port., p. 232, *M. difforme*.

409 Haw. Suppl. Fl. Succ., n. 89 (1810), and Rev. Fl. Succ., p. 103; Salm Dyck, Mes. § 7, f. 1; Berger, Mes. und Port. p. 231, f. 49, copied from Salm Dyck; N. E. Br. in Journ. Linn. Soc. Bot. Vol. XLV, p. 125. *M. bigibberatum*, Haw., in Phil. Mag., 1826, p. 328 (not n. 328 as I previously quoted, nor 1924, p. 325, as quoted in Index Hawensis); Salm Dyck, Mes. § 7, f. 4; Berger, Mes. und Port., p. 233.

Jansenville Division: Mount Stewart, Pole Evans, 5579. This was in cultivation before 1732.

This is one of the oldest known species in cultivation, and seems to vary very considerably in the size and shape of its leaves, as indicated in Fig. 186. In my previous account of it I was under the impression that the plant figured by Salm Dyck under the names *M. semicylindricum*, *M. difforme* and *M. bigibberatum* represented a different species; but in taking this view I was wrong, for last year my plant of *G. semicylindricum* produced leaves typical of that species and others like those of the plant Salm Dyck has figured under those three names, for as I have previously stated, those different three figures might all have been drawn from the very same individual in different years.

There can, I think, be no question that *M. semicylindricum*, *M. bidentatum* and *M. bigibberatum* are specifically identical, but whether this species is really distinct from *G. difforme* is a point that has yet to be conclusively decided. I have never seen *G. difforme*, as it appears to have died out of cultivation, and from the descriptions of it the only character that appears to distinguish it from *G. semicylindricum* is that the pedicel is shorter and quadrangular; when re-discovered possibly other characters may be found.

My drawing (Fig. 186) represents the upper part of five leaves, all from the same plant, and part of one leaf (the long, lower one) from another plant raised from seed out of the same seed-pod as that bearing the other five leaves.

4. *G. subditum*, N. E. Br. (Fig. 187).-- Leaves unequal, the pairs obliquely crossing one another, 1½-3 inches long, 4-5 lines broad, and 3-3½ lines thick, the larger leaf of a pair slightly concave above, very convex on the back, the shorter of each pair acute, and the longer prolonged beyond the ridge at the end of the flat part of the face into a compressed and keeled blunt point ½-¾ inch long, which is slightly incurved, and both leaves are usually curved edgewise to one side, green, pulicid-dotted. Pedicel 5-7 lines long. Calyx compressed, 3-angled, 4-lobed, with the two longer lobes keeled and ciliate on the keel, and the two shorter lobes with membranous margins. Corolla 2-2½ inches in diameter; petals in 1-2 series, linear, very obtuse and minutely toothed at the apex. Stamens yellow. Stigmas 10, short, plumose, yellowish.

Mesembryanthemum praepingue, Salm Dyck, Mes., 7, Fig. 5, Berger, Mes. und Port., p. 237, and all other modern authors, but not of Haworth.

Fig. 187 represents the apical portion of two of the large and one of the smaller leaves of each pair, adapted from Salm Dyck's figure, about natural size.

5. *G. cruciatum*, N. E. Br. in The Gardeners' Chronicle, 1922, Vol. LXXI, n. 9 (Fig. 188).-- Leaves usually pointing four ways, from the pairs obliquely crossing one another, 2½-3 inches long, 7-8 lines broad, dilating to 1 inch broad at the very base, curved

409 upwards edgewise, flat on lightly convex, especially near the base on the upper surface, convex on the back, and one leaf of a pair produced beyond the flat surface into a stout compressed and keeled blunt point, often more or less incurved and slightly oblique or twisted, very stout, succulent and soft to the touch, green, with roundish pellucid dots of various sizes. Pedicels about 9-10 lines long and 3 lines or more thick, very stout, subterete but somewhat 2-edged, of equal thickness throughout. Calyx large, 4-lobed; the two outer lobes shorter than the inner, keeled, with thin edges and blunt points; the two inner longer, very broadly membranous, not keeled. Corolla scarcely as large as that of *G. difforme*, ex Haworth, but according to Salm Dyck's figure nearly $2\frac{1}{2}$ inches in diameter; petals "not quite so long as those of *G. difforme*, but broader," ex Haworth, and according to Salm Dyck's figure in 2 series, about 11 lines long and nearly 2 lines broad, naturally pointed or subacute. Stamens very numerous, short, spreading, yellow. Stigmas 8-9. Capsule small for the size of the plant, tapering downwards, with a hollow or navel at the top, with 8-9 grooved ridges on the top, and with 8-9 valves and cells.

Mesembryanthemum cruciatum, Haw. Obs., p. 173 (1795), Misc. Nat. 35, Synop. Fl. Succ., p. 224, and Rev. Fl. Succ., p. 100; Salm Dyck, Mes., § 8, f. 9 (but not § 7, f. 7), not of Berger.

South Africa: Locality unknown; introduced by Aiton in 1791, according to Aiton, and if Haworth is right in identifying it with a plant described by Boerhaave it was in cultivation before 1755.

I have not seen this plant. The above description of it is made partly from that of Haworth, partly from an original drawing of the type plant at Kew, which Aiton caused to be made of it,

* The drawings preserved at Kew of the type plants of *Mesembryanthemum* and other genera that were described by Haworth and other authors, were made under the direction of W. T. Aiton, then Director of Kew Gardens, and Haworth evidently knew that they were being made, and undoubtedly alluded to them under *M. canum*, in his *Miscellaneous Naturalia*, p. 26 (1803).

and partly from Salm Dyck's figure of it. This plate (§ 8, f. 9) is made in the Kew collection of drawings, and Fig. 158 is adapted from it, but is missing from some, perhaps most, copies of the book, which is unfortunate, as it undoubtedly represents the true *M. cruciatum* of Haworth, while the plant Salm Dyck also figures as *M. cruciatum* at § 7 f. 7 is not at all the same species, differing in its leaves and and much this more slender pedicel. I have described this latter plant as *G. longipes*.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 82: 429. 1927.

(Continued from page 409.)

12.--GLOTTIPHYLLUM, HAW.

6. *G. longipes*, N.E.Br. (Fig. 195).-- Growth decumbent or prostrate. Leaves 3-3½ inches long and 6-8 lines broad, flat on the face, rounded on the back at the lower part, becoming keeled and compressed at the apex which in the larger leaf of each pair is produced shortly beyond the flat face and in side view is obtusely rounded, and this leaf is incurved, while the other leaf of each pair is acute in side view and strongly recurved, smooth, green, shining, somewhat pellucid-dotted. Pedicel about 1½ inch long and 2 lines thick, terete. Calyx 4-lobed; lobes broadly ovate, two of them keeled. Corolla 2-2½ inches in diameter; petals in two series, linear, obtusely pointed, entire, yellow. Stamens numerous, yellow. Stigmas 8, plumose, yellowish.

Mesembryanthemum cruciatum, Salm Dyck, Mes., § 7, f. 7 (not 8, f. 9), Berger, Mes. und Port. p. 237, f. 50, copied from Salm Dyck, not of Haworth.

South Africa: Locality and collector unknown, stated to have been raised at Schoenbrunn from South African seeds.

This species is unknown to me, and I have described it and illustrated the character of its leaves (Fig. 195) from Salm Dyck's figure and description above quoted, which, as I have explained under *G. cruciatum*, does not represent the true *Mesembryanthemum cruciatum* of Haworth.

7. *G. Salmii*, N. E. Br. in The Gardeners' Chronicle, 1922, Vol. LXXI, p. 9 (Fig. 196).-- Leaves unequal, the pairs more or less crossing one another so as to point four ways, the outer spreading, 2½-3½ inches long, 6-8 lines broad and about 4 lines thick at the base, gradually tapering to an acute apex, but the larger leaf incurved, while the smaller leaf is acute and recurved, flat on the face, with a slight pustule at its base, obliquely convex on the back, the larger leaf of a pair where it is produced at the apex; surface smooth, glabrous, very green, with a whitish basal mark, pellucid-dotted, finely fleshy. Flowers sessile. Calyx 4-lobed; lobes broadly ovate, obtuse, apiculate, all with submembranous edges, two of them gibbous-keeled. Corolla 2½ inches in diameter; petals in 1-2 series, cuneately linear, very obtuse and minutely denticulate at the apex, yellow. Stamens yellow. Stigmas 8, plumose yellowish.

Mesembryanthemum Salmii, Haw. Suppl. Pl. Succ., p. 89 (1819) and Rev. Pl. Succ. n. 100; Link and Otto, IC. pl. Select., p. 195, t. 44; Salm Dyck, Mes. § 7, f. 8; Berger, Mes. und Port., p. 236.

South Africa: Locality and collector unknown, stated to have been raised from seed at Vienna in 1814.

Haworth (Rev. Pl. Succ., p. 199) described three forms of this plant, namely:-- Var. *decussatum*, by which he means the typical *G. Salmii*, with leaves crossing one another more or less at right angles. Var. *semicruciatum*, Salm Dyck, Obs. Bot., n. 12 (1820). "Leaves obliquely distichous; straight, not exactly decussate and more tongue-shaped." And Var. *angustifolium*, "Leaves longer and narrower," *M. Salmii* var. *elongatum*, Salm Dyck, Mes. under § 7, f. 8.

Salm Dyck sent young plants of the varieties *semicruciatum* and *angustifolium* (the latter as var. *elongatum* to him in 1823, where drawings are made of them in that year. These drawings represent the leaves as straight and different in appearance from those represented in Salm Dyck's figure of *M. Salmii*, and the young leaves are very distinctly represented as being tipped with an apiculus, and I strongly suspect that these figures represent plants of *G. praeeriguum*.

429 No mention is made of an apiculus in the descriptions nor any representation of it in the figure of *G. Salmii*, so that possibly the above mentioned varieties really belong to *G. praepingue* or to some closely allied species.

I have not seen a living plant of *G. Salmii* and have adapted Fig. 196 from the figure, quoted above. In the present state of our knowledge of these plants and in view of such proofs of variation in the leaves as I am giving evidence of under *G. semicylindricum*, *G. fragrans* and *G. longum*, may it not be possible that *G. Salmii* is only a form of *G. praepingue*? The difference between them is that in the figure and description of *G. Salmii* no indication is made of the awn-like apiculus present on most of the leaves of *G. praepingue*, and the presence of a whitish basal mark on the leaves of *G. Salmii* that is absent on those of *G. praepingue*. More native material is needed to solve this problem.

8. *G. Marlothii*, Schwantes in Zeitschr. f. Sukkul., Vol. II, p. 242, with Fig. (1926), (Fig. 197).-- Growth more or less prostrate with age. Leaves in two ranks, spreading, straight or recurving, with the tip of one leaf of each pair uncurved or hooked sideways, 11-4 inches long and 8-10 inches broad at the middle, broader at the base, 4-5 lines thick, somewhat narrowing upwards to an obtuse or slightly hooked mucronate apex, flattened or faintly concave on the face, convex on the back and the larger leaf of each pair obliquely keeled at the apex, which is obtuse but often (or perhaps always) tipped with a smaller point or mucro at the end of the upper edge; surface smooth but under a strong lens seen to be covered with minute raised linear surface-cells transverse to the leaf, bright green, shining, pellucid-dotted and with a row of contiguous dark spots along each edge. Flowers sessile or subsessile, fragrant. Petals rather broad. Capsule stated to be 7-11 celled in the Latin description and 7-9 celled in the German, but as figured is 7-celled.

Uniondale Division: Karoo near Uniondale, Marloth 10991.

I do not possess this species, but Mr. E. Taylor, of Southborough having obligingly lent me his plant of it for the purpose of this description, I find that it is not allied to *G. grandiflorum* and *G. fragrans* as Schwantes states, but belongs to the same group as *G. praepingue*. Mr. Schwantes (as Berger and others have done) seems to accept the names as given by Salm Dyck as being correct, and therefore constantly creates confusion, whereas one has only to look at such of his figures as I have indicated under *G. semicylindricum* and *G. latum* and its variety to see that what is evidently but one species has been given several different names. Salm Dyck's figures are excellent, but as I have repeatedly stated, are often untrustworthy as

430 to names, and so long as writers upon this group of plants persist in accepting his names as correct without first investigating their authenticity, as so long will confusion exist.

Fig. 197 is reproduced by permission of Dr. Vauperyl from the figure in the Zeitschrift f. Sukkulentenkunde, by means of a photograph kindly sent to me by Mr. C. A. Maass.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 82: 449. 1927.

12-- GLOTTIPHYLLUM, HAW.

9. *G. praepinguum*, N. E. Br., in *The Gardeners' Chronicle*, 1847, Vol. LXXX, p. 9 (fig. 407).-- Haworth's characters for this species are:-- Leaves of different shapes and lengths--recurving--some between semicylindric and tongue-shaped--others narrower, longer and without any oblique curve or ridge near the points--others with subulate triangular points and ending in harmless, white bristles or short points-- and a few till broad, subcompressed-suboblongiform, keeled points ending in short, white, bristly hairs, exceedingly fleshy, fat and soft to the touch (on which account I have named it *praepinguum*---"very fat"); light green, shining, faintly punctate, whitish and shining near their inner bases or as if frosted over with exceedingly minute papillae, the young leaves minutely ciliate at the edges. Flowers nearly sessile (sessile at Rev. Fl. Succ., p. 95). Pedicel, if any, exceedingly short, rather angular and smooth. Ovary unequally 4-lobed; all the lobes with membranous edges and ciliate keels, one of them larger than the others, with broad, plain dilated bases, triangular points and slightly membranous edges, the other two shorter, with broad, brownish, reticulate markings. Corolla not so large as that of *my linguiforme* (i.e., 21, *G. latum*, N. E. Br.), of long duration; petals, linear-lanceolate, broad, minutely denticulate at the apex, bright yellow, shining. Stamens erect, expanding, yellow. Stigmas 2, plumose. Capsule sessile (Rev. Fl. Succ., p. 95), small, with 2 blunt ridges and a large deep central hollow on the top, 8-celled.

The above characters are as given by Haworth, but arranged differently, and clearly demonstrate that the plant figured by Salis Dyck (*Mes.*, 7, p. 5) as *G. praepinguum* cannot be the same as that described by Haworth under this name, there being no mention made nor representation in the figure of the "bristles or short points" (i.e., what is botanically called a mucro or apiculus) at the tips of any of the leaves: the flower is very distinctly pedicellate and the stigmas 10. I have therefore described Salis Dyck's plant as distinct, see 4, *G. subditum*, N. E. Br.

G. praepinguum has long since died out of cultivation, but I believe that a plant recently introduced is specifically identical with that which Haworth described, since it fairly agrees with his description and is entirely different from the plant Salis Dyck and all other authors have mistaken it for it. The following is a description of it compiled from four different living specimens:--

Leaves with the pairs more or less obliquely crossing one another, ascending-spreading, straight or curved to one side, 1 1/2-3 1/2 inches long, 5-8 lines broad at the middle, 4-5 lines thick, somewhat variable, sometimes parallel sided below and narrowing from above the middle to an acute or subobtuse point, sometimes gradually tapering from the base to an acute or obtuse apex, which is tipped with a short, whitish or brownish mucro or point that often disappears with age, and which I conceive to be the bristle or short point" of Haworth's description; flat or faintly convex on the face, often with an oblique ridge or keel near the apex of the larger leaf where the flat part ends, caused by the pressure upon it of the opposed leaf in bud; convex on the back and becoming slightly keeled or triangular at the apex of the smaller leaf or sometimes of both leaves of a pair, but in more adult growths the

449 apex of the larger leaf is more or less compressed and keeled, and slightly twisted to one side; substance very soft and pulpy; surface smooth, but under a strong lens seen to be covered with short, linear, raised surface-cells, transverse to the leaf, glabrous, light green, pellucid-dotted, sometimes appearing under a lens as if frosted at the basal part. Flowers sessile. Calyx in nature hughest about 3 lines in diameter, acutely 2-angled, produced above its union with the ovary into a tube about 1½ line long, 4-lobed above; lobes about 5 lines long, ovate, with membranous margins, two of them acute, and acutely keeled on the back, and the keel distinctly ciliate, and two obtuse. Corolla 11-12 inch in diameter, cup-shaped, expanding in the morning even in dull weather if the temperature is sufficient, but more widely open in bright sunshine; petals 4-10, in two series, all united for about two lines at the base, 11-14 lines long, 1-line broad, linear, acute, entire, clear yellow on both sides, not shining. Stamens erect, somewhat loose (this may be most worth means by "expanding"), entirely yellow. Stigmas 6-10, spreading, 2-lines long, acute, plumose, whitish. Ovary half-superior, 8-10-celled. Capsule when closed 5-7 lines and when extended 9-11 lines in diameter, with 8-10 valves and cells; valves horizontally spreading, 2½ lines long, pallid, with dark brown, expanding-keels, half as long as the valves and diverging from the base, acute and often very minutely toothed along the top, ending precipitously under the base of a minute terminal, awn-like point or tooth, without marginal wing; cells roofed with rather stiff, brownish cell-wings, and the opening nearly closed by a large, compressed, cream-coloured tubercle. Seeds about 2/3 line in diameter, nearly circular in outline, compressed, minutely tuberculate, dark brown.

Mesembryanthemum proserpinqua, L. f. Obs., p. 179 (1798), Disc. Bot., p. 77, Syn. Fl. Succ., p. 221, and Rev. Fl. Succ., p. 81, including the reference to "*M. heterophyllum*, Jackson in Andr. Bot. Rep., t. 540?"; not of Salm Dyck nor Berger.

South Africa: Locality unknown, introduced by Aiton in 1781, according to Aiton. But the plant above described is probably being the species was sent to New Gardens by Miss Aiton as coming from Prince Albert Division. And a plant of it in my own collection was sent to me as having been collected at Klearstroom, near the Zwartkops River, in Prince Albert Division, by Mrs. van der Stijl, &c.

Mrs. van der Stijl informs me that she "found few perfect plants as the stock seem to have eaten most of the centres out."

Fig. 207 is drawn from various leaves on the plants described above, of natural size, but the crinulus represented at the apex of the leaves often disappear.

10. *G. apiculatum*, N. E. Br. (Fig. 208).-- Leaves probably about 2 pairs to a growth when resting under natural conditions, but under cultivation 3-4 pairs to a growth, with the pairs placed very obliquely or at right angles to one another, ascending-spreading and one of each pair usually slightly recurving, mostly 1 1/4-2 1/2 inches long, sometimes shorter, 1/4-1/2 line broad and 1/4 line thick at the base, thence gradually tapering to a subacute apex, which is always tipped with a very short, hard, reddish point or crinulus; flat or faintly convex on the upper side, bluntly keeled down the back at the upper part and there tricuspid in transverse section, with the sides convex, microscopically ciliate on the edges and apical part of the keel of the younger pair of leaves, the cilia disappearing with age; substance fleshy: surface smooth, glabrous, with

449 the fleshy surface cells not raised into short and minute transverse ridges but microscopically and densely papulate, as seen under a very strong lens, uniformly grass-green, not at all glaucous and not pellucid-dotted. Pedicel $\frac{1}{2}$ inch long, slightly compressed, 2-edged, 3 lines broad and 2 lines thick, smooth, green. Calyx subequally 4-lobed, green or tinted with purple; lobes about $3\frac{1}{2}$ lines long and 3 lines broad, ovate, obtuse, two of them acutely keeled and with a blunt dorsal point, and two with white membranous margins. Corolla 2-2 $\frac{1}{2}$ inches in diameter, expanding in the morning irrespective of sunshine if the temperature is sufficient, closing about 7 p.m.; petals in 1-2 series, ascending-spreading, 10-15 lines long, 1-1 $\frac{1}{3}$ line broad, connately linear, obtuse and often denticulate at the apex, bright yellow, not shining. Stamens 450 very numerous, erect, forming a ring, leaving the stamens exposed to view, 4 lines long; filaments and anthers yellow, the former not bearded. Stigmas 8, $1\frac{1}{2}$ -2 lines long, radiately spreading, plumose, light yellow. Ovary slightly convex at the top, 2-celled; placentes on the outer wall or floor of the cells. Fruit not seen.

Oudtshoorn Division: Near Oudtshoorn, Merloth 12187.

Described and Fig. 208 (see p. 449) prepared from a living plant received from Dr. R. Merloth. This species bears some resemblance to *G. praeringue*, but its leaves are of firmer substance, not pellucid-dotted, and its flowers are pedicellate.

11. *G. concavum*, N. E. Br. (Fig. 209, p. 449).-- Rootstock bearing a number of crowded growths at the top, on very short divisions scarcely amounting to branches. Leaves 2-3 pairs to a growth, ascending until old, then spreading, 11-51 inches long, 4-9 lines broad and 3-5 lines thick at the base, narrow, somewhat semiterete and slightly tapering to an acute or blunt apex, usually somewhat curved or slightly sigmoid, one leaf or a pair concave and the other convex on the face, the concave leaf usually keeled on the back and often slightly twisted; soft and milky, smooth, glabrous, grass-green, the older leaves (but not the younger) distinctly pellucid-dotted when held against the light. Pedicel about 9 lines long and 3 lines thick, somewhat semiterete, being slightly flattened on one side and somewhat 2 edged. Calyx in mature bud 6-7 lines in diameter, 4-lobed; lobes 4-6 lines long, more or less keeled and three of the keels minutely ciliate, the outer lobes acute and the inner obtuse, with a dorsal point and broad membranous margins. Corolla 2-2 $\frac{1}{2}$ inches in diameter, opening in the morning, even in dull, sunless weather at a temperature below 60° Fahr. Petals numerous, free, or nearly so, in two distinct series, 11-16 lines long and 1-1 $\frac{1}{2}$ line broad, linear, obtuse and apically denticulate at the apex, bright clear yellow on both sides, not shining. Stamens numerous, collected into a central mass, 5-7 lines long, with appressed the stamens, yellow. Stigmas 10, radiating, 1 $\frac{1}{2}$ line long, plumose, yellowish.

Described and Fig. 209 prepared from a living plant sent to me by Mrs. L. Bolus. This species must be nearly related to *G. angustum*, Haw., but according to Haworth's description of the latter species, it differs by its pedicellate flowers, much smaller corolla and free or nearly free petals. The long and narrow leaves (which, when received, were only 4-6 lines broad, but have now become broader and thicker) concave on the upper side of the lowermost each pair, distinguishes this from all others known to me.

N. E. Brown

(To be continued.)

12.---GLOTTIPHYLLUM HAW.

470

12. *G. angustum*, N. E. Br., in The Gardeners' Chronicle, 1921, Vol. LXX, p. 327. Leaves linear--tongue-shaped, semicylindric, very long, 3-4 inches long and $\frac{1}{4}$ - $\frac{1}{2}$ inch broad according to Haworth, who described it from memory only (he subsequently gives no other dimensions). Flowers subsessile. Calyx very large and fleshy, 4-lobed, the larger lobes gibbous and keeled on the back. Corolla 3-4 $\frac{1}{2}$ inches in diameter, petals numerous, united at the base for about a quarter-of-an-inch, up to 2 lines broad, obtuse and absolutely crenate at the apex. Stamens yellow. Stigmas 10, long. Capsule with 10 ridges on the top.

M. angustum, Haw., bs., p. 176 (1795). Misc. Nat. 34, Syn. Pl. Succ., p. 222, and Rev. Pl. Succ., p. 101, not of Berger nor other authors.

South Africa: Locality unknown, introduced by Masson in 1790, according to Aiton.

The above description, taken from Haworth's account of it, contains all that is known of this species, which is evidently quite distinct from any that has hitherto been figured and unlike any species I have seen, although *G. concavum* N.E.Br., must be near it. The Haworth states that it can be "recognised at sight by its semi-cylindric leaves." The large flowers with the petals united for a quarter-of-an-inch at the base, however, distinguishes it from any other species at present known.

In his *Revisiones Plantarum Succulentarum* Haworth adds two varieties:--var. *pallidum*, which is a synonym of 13, *G. taurinum*, N.E.Br.; and var. *heterophyllum*, which is a synonym of 16, *G. longum* var. *hematum* N.E.Br.

13. *G. taurinum*, N.E.Br. in The Gardeners' Chronicle, 1922, Vol. LXXI, p. 9 or obliquely crossing one another, 2-2 $\frac{1}{2}$ inches long and 6-9 lines broad, semi-terete, flat above, obliquely convex on the back, one leaf often oblique (compressed and keeled) at the obtuse apex, very thick, uncurved or incurved, often somewhat finger-shaped and nearly as large as a finger, "the younger always incurved and resembling the horns of a bull," yellowish-green (in summer time), somewhat pellucid-punctate. Flower sessile. Calyx bifid, with the lobes unequally membranous and keeled, according to Haworth, but the flower he examined was doubtless abnormal and normally it probably would be 4-lobed. Stigmas 8-9, plumose. Corolla not described by Haworth, but according to Salm Dyck's figure, quoted below, it is about 2-2 $\frac{1}{2}$ inches in diameter, with the petals in 1-2 series, subacute or bluntly pointed at the apex.

Mesembryanthemum taurinum, Haw., Syn. Pl. Succ., p. 224 (1812), and Rev. Pl. Suc., p. 100 (1821); Berger, Mes. und Fort., p. 236. *M. angustum* var. *pallidum*, Haw., Rev. Pl. Succ., p. 101. *M. angustum*, Salm Dyck, Hort. Dyck, 1818, p. 17, and Mes., 57, Fig. 6; not of Haworth, *M. linguiforme* var. *angustum*, Berger, Mes. und Fort., p. 241.

South Africa: Locality and collector unknown.

Fig. 218 is adapted from Salm Dyck's figure quoted above under the erroneous name of *M. angustum*.

14. *G. uncatum*, N. E. Br., in The Gardeners' Chronicle, 1921, Vol. LXX, n. 236 (Fig. 219).-- Growth more or less prostrate. Leaves in two ranks, very spreading and slightly sloping downwards, 2-3 inches long and 7-8 lines broad, strap-shaped, more or less curved, flat above, obliquely convex beneath, with the apex of one leaf of a pair thickened and keeled on the back and slightly hooked or upcurved edgewise at the obtuse apex. Pedicels 6-9 (in fruit up to 12) lines long, compressed. Calyx 4-lobed. Corolla about 2 inches in diameter; petals in 1-2 series, acute, yellow. Stamens yellow. Stigmas 10, short, plumose, yellowish. Ovary globose, convex on the top.

Mesembryanthemum uncatum, Salm Dyck, Mes. 88, f. 6. *M. longum* var. *uncatum* and *attollens*, L., Rev. 11. Succ., p. 97 (1821). *M. linguiforme* var. *uncatum* and *attollens*, Berger, Mes. und Port., n. 240 and 241.

South Africa: Locality and collector unknown. It was raised at Vienne in 1816 from seeds received from South Africa according to Salm Dyck.

I have not seen this species. There is a good unpublished coloured drawing of it at Kew, made in 1823 from a plant received that year from Salm Dyck himself, from which Fig. 219 was adapted.

15. *G. proclive*, N. E. Br. (Fig. 220).-- Growths more or less decumbent or prostrate. Leaves in two ranks, directed forward in the direction of growth, more or less sloping downwards and somewhat spreading or diverging, 2½-4 inches long, 3-7 lines broad at the middle and 3-5 lines thick, upcurved edgewise or by a slight twist at the obtuse apex, flat or slightly concave on the face, convex on the back, the larger leaf of each pair being somewhat compressed and keeled where produced beyond the flat face at the apex. Flowers sessile or subsessile. Calyx-lobes all flat and apparently with very broad membranous margins. Corolla about 2½ inches in diameter; petals in two series, about one inch long, cuneately linear, obtusely pointed or notched at the apex, yellow. Stamens very numerous, apparently arranged in a dense ring. Stigmas 9.

Mesembryanthemum angustum var. *heterophyllum*, Salm Dyck, Mes., 7, f. 6B, not of Haworth. *M. linguiforme* var. *heterophyllum*, Berger, Mes. und Port., p. 241.

South Africa: Locality and collector unknown.

The above description is compiled and Fig. 220 adapted from Salm Dyck's figure above quoted as I have not seen any plant like it, for it is quite distinct from the plant Haworth called *M. angustum* var. *heterophyllum* (see 16, *G. longum* var. *hamatum*), differing conspicuously by its less hooked leaves, from which the elevated ridge along the lower margin of the larger leaf of a pair is apparently entirely absent, and by the sessile flowers.

16. *G. longum*, N. E. Br., in The Gardeners' Chronicle, 1922, Vol. LXXII, n. 9 (Fig. 221, p. 471).-- Leaves more or less in two rank usually about 3 pairs to a growth, at first ascending and then spreading, or remaining ascending under some conditions, 3-5 (or in young plants up to 9) inches long, 7-11 lines broad and 3-4 lines thick, strap-shaped, usually somewhat curved, very obtuse, or here and there obliquely pointed or rarely slightly hooked at the apex, flat on the face, convex on the back, with the thickest part of the convexity usually nearer one margin than the other and sometimes forming an oblique keel at the apex, soft and pulpy in substance,

470 smooth, glabrous, light green, shining, with a very evident nodule and somewhat, triangular swelling or pustule at the base on the upper side. Pedicels erect, 11-12 inch long, slightly compressed and about 3 lines thick, smooth, glabrous, green. Calyx 4-lobed, glabrous, green; lobes 5 lines long, the outer about 5-6 lines broad and the two outer 3 lines broad, ovate, obtuse and more or less membranous at the tips convex (not keeled) on the back. Corolla 2-2½ inches in diameter, expanding in the morning in bright sunshine, and lasting 4-5 days, not scented; petals numerous, in about 2 series, 14-15 lines long and 1 line broad, linear, acute, clear yellow, slightly shining, paler on the back. Stamens very numerous, erect in a ring around the stigmas and top of the ovary, about 3 lines long; filaments and anthers orange-yellow. Stigmas 10-11, about 1 line long, radiately spreading, plumose, greenish-yellow. Ovary partly superior, flattish-convex on the top, 10-11 celled; placentas on the floor or outer walls of the cells. Capsule about 8 lines in diameter and 4 lines long or deep, half-superior, about equally flattish-convex above and beneath, with 10-11 valves and cells; structure as for the genus.

Mesembryanthemum longum, Haw., Obs., p. 177 (1795). Misc. Nat., p. 34 (but not of Syn. Fl. Succ., p. 331, and Rev. Fl. Succ., p. 96); N.E.Br. in Journ. Linn. Soc., Bot., Vol. XLV, p. 70. *M. linguiforme* var. *δ*, Linn. Sp. Pl., ed. 1, p. 430, founded upon *M. folio linguiformi longiore*, Dillen. Hort. Elth., p. 133, t. 184, f. 1. *M. linguiforme* var. *longum* and *pustulatum*, Berger, Ges. und Fort., p. 240, *M. pustulatum*, Haw., Suppl. Fl. Succ., p. 98 (1819), and Rev. Fl. Succ., p. 96; Salm Dyck, Ges. 8, f. 10, and var. *lividum* Salm Dyck, 8, f. 106; N.E.Br. in Journ. Linn. Soc., Bot., Vol. XLV, p. 133. *G. pustulatum*, N.E.Br. in the Gardeners' Chronicle, 1921, Vol. LXX, p. 327.

471 Port Elizabeth Division: near Port Elizabeth, Burchell, Uitenhage Division: common about Swartkops, Despatch and Lerschevance, Ruir 3223, and near Uitenhage, 17-170 feet above sea level and flowering in December and January, Ruir 3224. Introduced into cultivation about 1700 or earlier, as the bad figure in Volckamer, Flora Noribergensis, p. 185 is doubtless intended to represent this species.

In my previous account of this genus in The Gardeners' Chronicle, as above quoted, I was not sure of the correct identity of *G. pustulatum*, because I had not then seen any specimen of definitely known to come from the region of Port Elizabeth Division, where Burchell found it. But now that Dr. Ruir has sent me plants from that area which are unquestionably *G. pustulatum*, I find that (as might be expected from its being a native of that well explored region) it is not uncommon in cultivation, and that beyond doubt is the same as *G. longum*, although neither Dillenius, De Candolle nor Haworth mention or figure the pustule at the base of the leaves, but as it is often not very conspicuous unless sought for, and not so distinct in this country as on native-grown specimens, may easily have been overlooked by them, or considered to be of no specific significance at the period (1795) when Haworth first described the species, for the pustule was not noted as a character of any species of this genus until twenty-four years later, when *G. pustulatum* was first described. Dillenius and De Candolle represent the pedicels as being 2½-3 inches long, and this, in my experience, is unusual, and must be due to some condition of cultivation.

It is somewhat remarkable that Haworth seems uncertain of his identification of *M. longum*, and must certainly have had two diff-

471 erent species under that name. For in 1795, under his original description, he states that:-- "Mr. Aiton does not notice this plant in his Hortus Kewensis, but I have seen it very fine at Kew." And in his Synopsis Plantarum Succulentarum (1-15), under *M. adscendens*, he writes: "If the next species but three (i.e., *M. longum*) is not the *M. folio linguiformi* lingiore of Dillenius, this may be it, but if so he had delineated the leaves too long." Later, (Rev. Pl. Succ. p. 96) he states that *M. adscendens* is "probably a variety of *M. longum*." This seems to indicate that he was not very clear as to what *M. longum* was. All the above are described as having the pedicel "longer than the calyx" or "to inches long or more." But under *M. longum* in his Rev. Pl. Succ., p. 96, he describes the flowers as subsessile. So that this would appear to be some different species. Evidently there is some confusion, for under *M. longum* var. *flaccidum* on p. 96 of Rev. Pl. Succ., Heworth quotes both Volckner's figure mentioned above the figure in the Botanical Magazine, t. 1866, as representing the same species. But Volckner's plant has erect or ascending long leaves and pedicellate flowers and is no doubt a bad figure of *G. longum*, while Bot. Mag., t. 1866, represents a plant with short leaves pressed down close to the ground and sessile flowers and belongs to *G. depressum*.

Var. *hamatum*, N.E.Br. (Fig. 222).-- Growths pressed upon the ground. Leaves not spreading but directed forwards in the direction of growth, 2-3 inches long, 7-10 lines broad and one leaf of a pair 3-4 lines thick and the other 1-3 lines thick, strap-shaped, straight or slightly incurved edgewise, the smaller leaf flat or faintly convex on the face, convex on the back and obtuse at the apex, and the larger leaf of each pair with the face somewhat obliquely concave, from being raised all along the lower margin into a strong and somewhat scute ridge, obliquely and bluntly keeled on the back, and with a very large and conspicuous obliquely incurved hook at the apex; both leaves have a pustule or swelling at the base; surface smooth and shining, and the surface-cells neither raised nor depressed as seen with a strong lens, light green. Pedicels 7-7 lines long, slightly compressed and slightly 3-edged, 7-3½ lines broad. Calyx (a dried flower only seen) subequally 4-lobed; lobes about 4-5 lines long and 3½ lines broad, ovate, two of them acutely keeled. Corolla about 1½ inches in diameter according to the figure; petals numerous, in 2 series, free or nearly so, apparently 12-13 lines long and 1 line broad, connately linear, obtuse yellow. Stamens very numerous, about 2 lines long, yellow. Stigmas 8-9, about 1 line long, spreading, plumose. Capsule when closed 7-8 lines and when expanded 12-13 lines in diameter, shortly and broadly obconic, flattish, with 8-9 gaping ridges on the top, and with 8-9 valves and cells; brown outside, pallid within; valves reflexed; bending keels distant, subparallel, with acute and microscopically denticulate edges, pale ochraceous-brown or honey-coloured, tipped with a linear or oblong-linear membrane; cells acutely roofed and the opening nearly closed by a very large white tubercle. Seeds 1 line in diameter, compressed-globose, with a small inflexed nipple, smooth, pale brown.

Mesembryanthemum heterophyllum, Jackson, in Andrews, Bot. Rep., Vol. VIII, t. 540 (1808), not of Heworth nor Solms-Lyck. *M. striatum* var. *heterophyllum*, Kew., Rev. Pl. Succ., p. 102.

Uitenhage Division: Near Uitenhage, 170 feet above the sea level, Muir 3824 growing on the same root as the type form. ex Dr. Muir.

When I received a plant of this remarkable form from Dr. Muir, I at once noticed it as being the same as that figured in Andrews' Botanical Repository as above quoted, of which I cannot find any record that it has been in cultivation there since the period of that figure. As I received it without information of its origin I naturally considered such a distinct-looking plant to be a distinct species, and made the above description of it. When, however, I received information of its origin from Dr. Muir, it was as follows:-- "It *Gloett. rustulatum* and your proposed *Gloett. erectum* both grew on the same root, and are both from near Cuthbert, 170 feet. You get flat adult leaves and leaves extensively beated as you noted. The latter is one of the turgid very succulent forms which it assumes. Some of them are as hooked as the hooked index finger. My No. 824 I collected myself. I have other collections of the same plant which I brought from gardens at East London. They were also collected in Cuthbert Division at Dispersal, and taken to East London, and they show the same heterophylly. If collectors had any sent such valuable information as this with plants sent to Europe many errors would have been avoided.; for I doubt if any cultivator or botanist in this part of the world without knowledge of the fact would have suspected that the two forms of leaves represented by Figs. 221 and 222 grew upon the same root and are therefore not even legitimate varieties, although, for garden purposes, I have here so considered them. It is remarkable that besides the difference in the shape of the leaves, the portion of the plant sent to me with hooked leaves also differs from the typical form of *G. rustulatum* by having shorter pedicels and fewer stamens and valves and cells to the capsule.

The only other known species described as having a pustule at the base, are the allied *G. erectum* (which differs by its ascending stems and leaves, and by its leaves being more acute and more centrally pointed), and the very dissimilar *G. grandiflorum* and *G. Salmii*, which both have sessile flowers.

I am informed by Dr. Muir, to whom I am indebted for living native material of this species and its varieties, that "in its native habitat a number of the growths grow from one stem, and as they get larger tend to slope towards the ground. They form patches a yard or more in diameter, so dense that the ground is completely covered. The leaves are pale green, and when they get water reach a length of ten inches." Figs. 221 and 222 are both made from the plants sent to me by Dr. Muir under No. 824 as being portions from the same root, as above stated. The plants from Alice, which I formerly thought might be *G. rustulatum*, proves (now that I have seen the true *G. rustulatum* (i.e., *G. longum*) from its type locality) to be distinct, and belongs to the next species, *G. erectum*.

G. longum var. *angustius*, and *rufescentes*, Haw., Rev. Fl. Succ., p. 36327; Berger, Mes. und port., p. 240 are quite unknown, and may possibly belong to some other species.

N. E. Brown
(To be continued.)

MESELBRYANTHEUM.

Gard. Chron. III. 82: 489. 1927.
(Continued from page 471.)

12.--GLOTTIPHYLLUM, HAW.

17. *G. erectum* N.E.Br. (Fig. 231, and p. 291, Fig. 132).-- Stems elongating, decumbent or prostrate, and up to 8 inches long, 4 lines thick, sparingly branched with 2-5 pairs of leaves at the end of each branch. Leaves usually in 2 ranks, but sometimes the pairs obliquely cross one another, distinctly erect or ascending, $2\frac{1}{2}$ -5 inches long, $\frac{1}{2}$ -1 inch broad and 3-5 lines thick, these variation even on the same plant at the same time, strap-shaped, with parallel sides for $\frac{2}{5}$ of their length, then tapering to an acute or obtuse apex, which is apiculate, at least when young, flat or slightly convex on the face, convex on the back, not keeled, and all similar at the tips, soft and pulpy; surface smooth, glabrous, deep grass-green. Pedicel smooth, glabrous, deep grass-green $1\frac{1}{2}$ inch long $1\frac{1}{4}$ line thick, erect, terete, glabrous, green. Calyx subequally 4-lobed, green, triangular and about 5 lines in diameter when in mature bud, the outer lobes 6-7 lines long, 3 lines broad, ovate-lanceolate, acute, and acutely keeled down the back,. Corolla 2-2 $\frac{1}{4}$ inches in diameter, expanding in the morning in full sunshine only, closing about 3 p.m.; petals 40-45, in 2-5 series, slightly ascending spreading (not horizontally spreading), 12-13 lines long, $\frac{1}{2}$ -1 line broad, linear, obtusely pointed at the apex, entire, bright clear yellow on both sides, but scarcely or slightly shining. Stamens very numerous, erect, 3-3 $\frac{1}{2}$ lines long; filaments not bearded, yellow; anthers light orange-yellow. Stigmas 8, ascending, $\frac{1}{2}$ line long, plumose, yellow.

Victoria East Division: Near Alice, Leslie.

This is the plant which, in *The Gardeners' Chronicle*, 1921, Vol. LXX, p. 327, Fig. 146 I though might be *G. pustulatum*, but now that I have obtained from Dr. Mir the true *G. pustulatum* from Uitenhage Division I find to be quite distinct and well characterised by the constantly erect or ascending and acute (not obtuse) leaves. A living plant with fruit upon it, from which I raised several plants, was sent to me several years ago by Dr. T. N. Leslie. Fig. 231 shows the character of the apex of the leaves, by which it may be distinguished from *G. pustulatum*, and also the pustule.

18. *G. grandiflorum*, N.E.Br., in *The Gardeners' Chronicle*, 1921, Vol. LXX, p. 327 (Fig. 232).-- Growths prostrate. Leaves in two ranks, slightly sloping downwards and adpressed edgeways to the ground, 3-4 inches long and an inch or rather more in breadth, strap-shaped, flat on the face, with a large pustule at the base, convex on the back, obtuse and slightly hooked or upturned edgeways at the apex, and the larger of each pair with an oblique keel on the face near the apex, very fleshy, pale green. Flower sessile. Calyx 4-lobed, with ovate lobes apparently about as broad as long. Corolla 3-4 inches in diameter, scarcely scented; petals in two series, cuneately linear, obtuse and minutely toothed at the apex.

Mesembryanthemum grandiflorum, Haw., in *Phil. Mag.* 1826, Vol. LXVIII, p. 327; Salm Dyck, *Mes.*, 8, f. 3. *M. linguiforme* var. *grandiflorum*, Berger, *Mes. und Port.*, p. 242.

South Africa: Locality unknown; introduced to Leslie in or about 1826.

This fine species appears to have died out of cultivation and has not been rediscovered. I have never seen. Fig. 232 is adapted from Salm Dyck's figure quoted above.

19. *G. Muirii*, N. E. Br. (Fig. 233).-- Growths bent towards the ground. Leaves spreading, more or less sloping downwards, in

489 two ranks, usually 3-4 $\frac{1}{2}$ (but occasionally up to 6 $\frac{1}{2}$ inches long, 10-15 lines broad and 6-7 lines thick at the middle, straight or but slightly curved edgeways, strap-shaped, with parallel sides, but with the tips of both leaves of a pair upcurved-hooked edgeways, and the hook obliquely-truncate or irregularly shaped and obtuse or very acute, flat or faintly convex on the face, and the face of the larger leaf with an impression of the opposed leaf upon it, forming a ridge along the margin at the middle part and an obliquely transverse ridge below the apex, convex and not keeled on the back; surface smooth, but under a strong lens seen to be covered with transversely-elongated, raised surface-cells, deep grass green. Flower sessile. Calyx triangular and about 6-7 lines in diameter

490 in bud, 4-lobed, lobes 4-7 lines long, 3-4 lines broad, 3 of them keeled and 2 distinctly ciliate on the keels, the inner with broad membranous margins. Corolla opening in the morning in dull or sunny weather, 3-3 $\frac{1}{2}$ inches in diameter, not scented; petals numerous, free or nearly so, in two series, somewhat wavy, as if from crumpling in bud, 16-18 lines long, 1 $\frac{1}{2}$ -2 lines broad, linear, obtuse and usually minutely toothed at the apex, bright clear yellow. Stamens numerous, 7-8 lines long, erect and collected into a central mass, concealing the stigmas, light orange-yellow. Stigmas 8, about 1 $\frac{1}{2}$ line long, plumose, whitish.

Riversdale Division: In the Klein Karoo, 1,200 feet above sea level. Muir 3876.

This is a very fine and distinct species, quite unlike any other, and I have therefore dedicated it to its discoverer, Dr. J. Muir who has helped me so vigorously in this work with specimens and information. Dr. Muir writes (June 2, 1926), concerning the two extreme forms that exist in nature of the various species of this genus, as previously noted, that he "had both extreme forms (of *G. Muirii*) and of which the smaller, harder form had remained as such since 1924, has now during the past few weeks undergone a change and become greener and juicier, and are quickly assuming the other form." This and other species Dr. Muir states are popularly called the Dutch colonists "Skilpadkos," i.e., "tortoise food." The plant from which my sketch (Fig. 233, p. 489) was made, was sent to me as being one of the "smaller and harder" forms.

20. *G. carnosum*, N.E.Br. (Fig. 234, p. 489).-- Growths apparently tufted or crowded upon the top of the rootstock, more or less depressed towards the ground. Leaves in two ranks, very spreading, 1 $\frac{1}{2}$ -3 inches long, usually 9-10, but sometimes up to 13 lines broad, 4-7 lines thick, more or less strap-shaped with parallel sides, usually slightly curved edgeways downwards, and one leaf of a pair recurving, sometimes very slightly upcurved edgeways (but not at all hooked) at the apex, one leaf of a pair flat and the other slightly convex on the face, and the larger leaf produced beyond the oblique ridge where the flat face ends and obliquely keeled, very convex on the back, obtusely and often obliquely rounded at the apex, rarely with a minute apiculus; substance thick, soft and pulpy; surface smooth, but with minute, raised, linear, transverse surface-cells as seen under a strong lens, glabrous, grass-green, not pellucid-dotted. Flowers sessile. Calyx 8-9 lines in diameter in mature bud, acutely 3-angled, unequally 4-lobed, with three of the lobes acutely keeled on the back, the two larger 8-9 lines long and about 4 lines broad, ovate, acute.

490 Corolla 3 inches in diameter, cup-shaped, opening in sunshine, slightly scented; petals about 45, in 1-2 series, $1\frac{1}{2}$ -1 $\frac{1}{2}$ long when sub fully developed, $1-1\frac{1}{3}$ line broad, linear, with subacute and more or less revolute tips, bright clear yellow, scarcely paler on the back not shining. Stamens erect, lax, about $\frac{1}{2}$ inch long, entirely light yellow. Stigmas 6-8, radiating, about 2 lines long, plumose, whitish. Capsule when closed, $4\frac{1}{2}$ -5 lines in diameter, convex and without ridges at the top, with 6-8 valves and cells, and when expanded 7-8 lines in diameter; valves horizontally spreading; $2\frac{1}{2}$ lines long and 2 lines broad, light brown; expanding keels dark brown, without an awnlike or membranous tip, otherwise the structure is the same as for the genus. Seeds about $\frac{1}{2}$ line in diameter, somewhat angularly subglobose or irregularly ovoid, with a very small nipple, minutely tuberculate, dark brown.

Edinburgh Division: Between Edinburgh and Toun's Bay, 2,000 feet above sea level, growing in open places among loose shingle, Muir 3894.

When Dr. Muir sent a plant of this species to me he commented upon the greyish-green appearance of its leaves, and when received the leaves certainly had a slight greyish-green colour, but the fresh leaves that it has made are grass-green; whether they will become greyish during hot summer weather remains to be seen.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 82: 509. 1927.

(Continued from page 490.)

12.--GLOTTIPHYLLUM, HAW.

- 509 21. *G. latum*, N. E. Br., in The Gardeners' Chronicle, 1921, Vol. LXXI, n. 327 (Fig. 246.)-- Growths more or less pressed upon the ground. Leaves in two ranks, straight or slightly curved downwards edgeways, those of the smaller form about $1\frac{1}{2}$ - $2\frac{1}{2}$ inches long, and of the larger form $2\frac{1}{2}$ - $4\frac{1}{2}$ inches long, 6-9 lines broad and 2-4 lines thick, strap-shaped and of about equal breadth throughout, broadly rounded or subtruncate at the apex, with or without a short mucronate point at the end of the upper edge, flat or nearly so on the face, without any pustule at the base, more or less convex on the back, smooth, glabrous, soft and pulpy, uniformly green, not at all glaucous, shining. Pedicels 3-10 lines long, and in fruit-- where left uncovered by the bases of the leaves-- up to an inch long, 3-angled, $2\frac{1}{2}$ lines thick, glabrous. Calyx subequally 4-lobed; lobes 4-6 lines long, ovate, obtuse or subacute, three of them acutely keeled on the back. Corolla $1\frac{1}{2}$ - $2\frac{1}{2}$ inches in diameter, expanding only in bright sunshine in the morning and closing in the afternoon, about 5 p.m., not fragrant; petals numerous, in 2 series, 11-13 lines long, $\frac{2}{3}$ line broad, linear, acute, bright yellow, tinged with coppery or reddish on the back at the tips. Stamens very numerous, $3-3\frac{1}{2}$ lines long, bright deep yellow; filaments not bearded. Stigmas 9-10, radiating, $1\frac{1}{3}$ line long, stoutly plumose, acute, greenish-yellow. Ovary partly superior, convex on the top, 9-10 celled. Capsule broadly obconic, with a raised, dome-shaped top, with 8-10 valves and cells, 6-7 lines in diameter when closed and 10-12 lines in diameter when expanded; valves pallid within; ex-
- 510

510 pending keels dark brown, with pallid, awn-like tips; cell-wings brown; tubercle ochreous! Seeds $\frac{1}{2}$ line in diameter, compressed-ellipsoid, with a small nipple at one end, nearly smooth, being only very minutely tuberculate as seen under a strong lens, brown.

G. obliquum, N.E.Br., in The Gardeners' Chronicle, 1921, Vol. LXX, n. 336. *Mesembryanthemum latum*, Haw., Obs., p. 186 (1795). Misc. Nat., n. 32, Syn. Pl. Succ., p. 220, and Rev. Pl. Succ., n. 98, founded upon *M. folio linguiformi latiore* Dillen., Hort. Elth., p. 236, t. 184, f. 225. *M. latum* var. *brevre*, Haw., Rev. Pl. Succ., n. 99. N.E.Br., in Journ. Linn. Soc. Bot., Vol. XLV, p. 69. *M. linguiforme*, Salm Dyck, Mes., § 8, f. 4 (1808), and Rev. Pl. Succ., p. 221, and Rev. Pl. Succ., p. 97; Lodd., Bot. Cab., t. 1307, and vars. *subcruciatum*, *prostratum* and *assurgens*, Haw. Rev. Pl. Succ., n. 97; *M. linguiforme* var. *g.*, Linn. Sp. Pl., ed. 1. n. 488, founded upon *M. folio linguiformi angustiore*, Dillen. Hort. Elth. p. 237, t. 185, f. 226. *M. linguiforme* var. *latum*, Salm Dyck, Mes., § 8, f. 4. *M. obliquum* Dillen., Sp. Pl. Vol. 11, p. 1027 (1799), also founded upon f. 226 in Dillen. Hort. Elth.; N.E.Br. in Journ. Linn. Soc. Bot., Vol. XLV, n. 71. *M. medium*, Haw., Suppl. Pl. Succ., n. 88 (1819), and Rev. Pl. Succ., n. 95; N.E.Br. in Journ. Linn. Soc. Bot., Vol. XLV., n. 132. *M. adscendens*, Salm Dyck, Mes. § 8, f. 4, and perhaps of Haworth, see note below. *M. linguiforme* vars. *adscendens* and *obliquum*, Berger, Mes. und Port. n. 241. Probably *Ficoides africana* acaulos, folius latissimis, etc., Bradley, History of Succulent Plants, Decade III, p. 6, f. 24 (1725) should be referred to this species.

Var. *cultratum* N. E. Br. (Fig. 246 F-G).-- Leaves more or less curved downwards, edgeways, with the tips slightly upcurved. Pedicels about an inch long. Corolla about 2 inches in diameter and like that of the type.

G. cultratum, N.E.Br., in The Gardeners' Chronicle, 1921, Vol. LXX, n. 336. *Mesembryanthemum cultratum*, Salm Dyck, Obs. Bot., n. 7 (1820) and Mes. § 8, f. 5; Haw., Rev. Pl. Succ., n. 95. *M. depressum*, Salm Dyck, Mes., § 8, f. 7 (not of Haworth, nor of Bot. Mag., t. 1866). *M. linguaeforme*, Salm Dyck, Mes., § 8, f. 8. *M. longum* and var. *flaccidum*, Haw., Syn. Pl. Succ. pp. 221-222 (1812), and Rev., Pl. Succ., n. 96 excluding synonymy (but not *M. longum* of Haw. Obs., 177, which was founded upon a Dillenian plant with ascending leaves, whilst Haworth describes later a plant with leaves pressed upon the ground). *M. lucidum*, Haw., Suppl. Pl. Succ., n. 89, and Rev. Pl. Succ., n. 95, excluding synonymy, not of Miller. *M. longum* var. *declive*, Salm Dyck, Mes., § 8, f. 9B, not of Haworth. *M. linguiforme*, vars. *declive*, *depressum* and *cultratum*, Berger, Mes. und Port., p. 240.

Riversdale Division: On hills near Riversdale, 700 feet alt.; Muir 3874, 3875 Mossel Bay Division, near the Little Brak River, Burchell. This was in cultivation before 1732.

This species varies considerably, and much confusion of names has been created by Haworth, who first wrongly described it as being *M. linguiforme*, Linn., and then described various slight forms of it as species and varieties, in which others have followed him. Salm Dyck made further confusion by figuring this species and its variety under several different names. I have again studied all Haworth's descriptions with close attention to detail and compared them with all the drawings and published figures relating to them at Kew, and this comparison, with the aid of living plants and some information about them in their native country received from Dr. J. Muir, has enabled me to alter my former view that *G. latum*, *G. obli-*

510 ouum, and *G. cultratum* were three distinct species, and also to feel confident, that the synonymy as here given is (at least, for the greater part) correct. His reference to *M. adscendens*, Haw., Syn. Fl. Succ., n. 220 (1812), and Rev. Fl. Succ., p. 96, however, there is some difficulty in understanding what about *adscendens*. His description of it as follows:-- "Leaves ascending, broadly tongue-shaped, very obtuse, green. Flowers pedunculate," and in another description "peduncles longer (than is *G. latum*).". And he adds, "The leaves are more ascending and paler than in the last *M.*, *G. latum*", and the peduncles longer. If the next species, but *longum* (i.e., *M. longum*) is not the *M. folio linguiforme longiore* of Dillenius, this may be it; but, if so, he has delineated the leaves too long." This description seems more to agree with *G. latum* than with *G. latum*, and in Rev. Fl. Succ., p. 96, he remarks, "Probably in variety of the former" (i.e., *M. lucidum*, Haw., which is *G. longum*). There is, however, a drawing at Kew, undated, but probably made somewhere about 1820, labelled "*M. adscendens*, Haw.," which represents a plant of *G. latum*, with leaves spreading near the ground, and is very like that which Salm Dyck has figured as *M. adscendens*, except that the pedicels and calyx are not represented as being tuberculate, and which I believe is the same as that Salm Dyck's figure 8, f. 4 represents *M. latum* var. *breve*, Haw., Misc. Bot., n. 33 = *M. latum* var. *breve*, Haw., Rev. Fl. Succ., p. 99. But these tubercles I believe to be due to the attack of some mite; they are not normal plant-tubercles and occur but rarely in my experience. I do not remember to have seen them on a *Glottiphyllum*, but I have on other genera, where also they are not normal structures.

If this drawing at Kew and Salm Dyck's figure are correctly named, then I would suggest that Heworth described *M. adscendens* from a plant of *G. latum* that had been grown under glass and not fully exposed to the sun. It is now in a more normal position of *G. latum* that I possess, which, as I write (January, 1927), have ascending leaves, yet when received early in 1926 the leaves yet more or less pressed down edgeways near to the ground, not ascending; the alteration to an ascending position being due to the very unfavourable condition of an absence of direct sunlight during the three winter months.

Several plants of this species were sent to me by Dr. J. Muir, some of the smaller and harder type and some of the softer and more juicy form, of which remarks have already been made under the genus. Under the unnatural conditions in which I have to cultivate them, these plants have much altered in appearance, and if placed in the hands of most cultivators of succulents, without knowledge of their origin, would probably be regarded as distinct species, or at least varieties. One of the, which, when received, had nearly straight leaves, after a time developed leaves curved downward with slightly concave lower side, exactly as is shown for *M. cultratum*. In January, 1927, this put forth a pair of apparently straight leaves, but whether these will remain straight or eventually become curved like the others is at present unknown. This specimen is illustrated by Fig. 246, F. and G., and clearly demonstrates that *G. cultratum* is not a distinct species, but merely a variation of *G. latum*, just as I now find that *G. obliquum* is merely a smaller form of this species, they are merely individual forms of one species, for there is no difference in their flowers. It is strange that Salm Dyck figures this variety *cultratum* under

510 no less than four different names, for the four figures quoted above under that variety are certainly only individual forms of one plant and might even have been made from the same specimen in different years. The question arises, is this a variation that is due to cultivation and not found in the wild state? For having seen one of my imported plants change under my own eye from the straight-leaved *G. latum* to the curved-leaved variety *cultratum*, I wrote to Dr. Muir for information as to whether *G. cultratum* occurred with *G. latum* in its native habitat. He very kindly made a journey to the locality where it grows wild, and writes concerning it:-- "I examined several hundred of plants in the localities of my 3874 and 3875. Please note that in nature not one showed any evidence of the cultrate form which is evidently the sybaritic cultivated London or Salm Dyckian form of *G. latum*." This would seem to be conclusive evidence that the two forms are merely conditional variations of the same individual under cultivation only, and so, for garden purposes, the varietal name *cultratum* may be dispensed. If further proof is needed that *G. latum* and *G. cultratum* are one species, I may mention that at least there is an original one, dated "Dec. 2, 1823" made from a plant received from Prince Salm Dyck in 1822 under the name of *G. cultratum*, which represents the plant as having nearly straight leaves, just as my plant (mentioned above) had when received from South Africa.

Dr. Muir informs me that in their native localities this and other species will "stand frost well. But when they are brought into a garden (meaning in South Africa in the region where they grow wild) and get more water they swell up, become bloated and very luxuriant but invariably blacken and die when frost comes and catches them in this abnormally luxuriant state." This information indicates that these plants should receive very little water during the winter, in Europe, if it is desired to keep the more choice and delicate species alive.

22. *G. depressum*, K.E.Br., in The Gardeners' Chronicle, 1921, Col. LXXI, p. 327 (Fig. 247).-- Growths pressed upon or directed towards the ground. Leaves 2-ranked, apparently about 2-2½ inches long and 7-8 lines
511 broad, and of nearly equal breadth throughout, nearly horizontally spreading or slightly closing inwards and slightly curved towards edgeways at the tips, strap-shaped, obtusely rounded at the apex, with a short point directed forwards at the upper side, pale green (in the original drawing the upper side is pale green in the reproduction of it). Flowers sessile. Calyx unequally 4-lobed; three of the lobes keeled and two keels dimly ciliate. Corolla cup-shaped, 2 inches or more in diameter, expanding in sunshine only, not in cloudy or dull weather; petals in 2 series, acute, yellow, with a red midline and the apex itself frequently red on the back. Stamens short, yellow. Stigmas 10, ovary short, ovate-lanceolate (probably plumose), incurved, yellowish. Capsule depressed, with 10 ridges on the top and 10 cells.

Mesembryanthemum depressum, Haw., Misc. Nat., p. 33 (1803), Synon. Pl. Succ., p. 221, and Rev. Pl. Succ., p. 99. Bot. Mag. t., 1803, not of Salm Dyck. *M. rufescens*, Haw., Syn. Pl. Succ., p. 221 (1803), and Compl. Pl. Succ., p. 50 (1819). *M. longum* var. *decliv.*, Haw., Rev. Pl. Succ., p. 98 (1821). *M. lineariforme* var. *rufescens*, Haw., Rev. Pl. Succ., p. 98. *M. lineariforme* var. *flaccidum*, Berger, Mes. und Fort., p. 240.

511 South Africa: Locality and collector unknown. Cultivated by Haworth in 1795.

This species is unknown to me, and the above is compiled partly from the original description of Haworth and partly from the figure in the Botanical Magazine which accurately agrees with Haworth's description, and from which I have adapted Fig. 247.

Haworth, however (Rev. Pl. Succ., p. 96), wrongly refers the figure in Bot. Mag., t. 1286, to his Mesembryanthemum longum var. floccidum, which was founded upon a very different species with pedicellate flowers (see *G. latum* var. *cultratum*, and under *G. longum*), and I think it probable that Haworth intended to quote the Bot. Mag. figure under *M. longum* var. *declive*, which he places after var. *floccidum*, and which has sessile flowers and according to description otherwise agrees with *G. depressum*, but by some accident he entered the quotation in the wrong place.

Haworth also wrongly quotes (Syn. Pl. Succ., p. 221) fig. 226 of Dillenius, Hort. Elth., as belonging to *G. depressum*. But the Dillenian figure has pedicellate flowers and belongs to *G. latum*, N.E.Br. which see.

I believe *M. rufescens*, Haw., should be referred to this species. There is no figure of it at Haw., but it is only known from Haworth's description, which in the sessile flowers and other characters stated seems to accord with *G. terrestris*. The rufescent colour of the leaves mentioned by Haworth is not a specific character, but is doubtless due to some cultural cause.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Card. Chron. III. 23: 17. 1795.

(Continued from Vol. LXXII, p. 511.)

12.--GLOTTIPHYLLUM, HAW.

- 13 23. *G. suave*, N.E.Br. (Fig. 7).-- Growths in the only plant seen crowded. Leaves directed forwards, not very spreading, $1\frac{1}{2}$ -2 inches long, 8-12 lines broad and 3-6 lines thick on an imported plant, probably becoming larger on an imported plant, probably becoming larger under cultivation, with the pairs more or less obliquely crossing one another, flat on the face and one of a pair with an oblique keel at the apical part, and much thicker and more convex on the back than the other, usually more or less tongue- or strap-shaped, with parallel sides, but sometimes narrowing upwards, without a pustule at the base; apex variable, in the thinner and flatter leaf sometimes rounded, with a central very short, blunt point, sometimes obliquely subtruncate with a short, hard point at the end of the upper edge, as is usually the case with the opposed leaf having a keel on its face, its back being obliquely keeled and somewhat twisted at the apex; substance firmly fleshy; surface smooth, but with the usual raised surface-cells, as seen under a strong lens, dull green, sometimes tinted with brownish, scarcely shining, not pellucid-dotted. Pedicels none, or 5-6 lines long, subterete, very slightly 2-edged, glabrous. Calyx 5 lines in diameter in mature bud, produced beyond its union with the ovary into a short tube about 1 line long, 4-lobed above, three of the lobes about 2 lines long and 2-3 lines broad, the fourth lobe being about 4-5 lines long, all with whitish, numerous markings, but the middle lobe and one of the

13 on the longer lobe; three of them are slightly keeled and the keel ciliate on the back. Corolla expanding in the morning, irrespective of sunshine and even in a darkened room, at first cup-shaped and about 2½ inches in diameter, finally nearly flat, with recurved tips to the petals and nearly 3 inches in diameter, when closed the petals twist together, in the early stages of the flower they all close together at the tips, but later, when they have grown longer, they twist closely together to about the middle, and then the tips spread out; fragrant; petals about 50, in 1-2 series, finally rather lax, 1-1½ inch long, 1 line broad, linear, obtuse or somewhat acute, entire, clear yellow on both sides; shining. Stamens numerous, arranged in a ring, about ½ inch long, yellow. Stigmas, 8, about 2 lines long, plumose, very pale yellowish or whitish. Ovary partly superior, flattish on the top.

Ladismith Divison: Near Klathius, Noir 3989.

This species is evidently allied to *G. depressum* and *G. fragrans*, it leaves being somewhat like those of *G. depressum*, but less spreading, and it differs from both species by having pedicellate flowers. The calyx is very much smaller than that of *G. fragrans*, and I suspect also than that of *G. depressum*, but the latter I have not seen. It is stated, however, not to expand its flowers except in bright sunshine, while I find the flowers of *G. suave* will expand in a very dim light, for after taking the plant into a room to describe, I left it there all night, with its flowers tightly closed, and was astonished to find the corolla widely expanded in the morning between 8 and 9 am., while the room was very dimly illuminated, daylight being excluded by a Venetian Blind and side curtains and the morning sunless and cloudy. I left the plant in the room all that day (at the end of January), and at night excluded as much light as I could by means of the blind and curtains, the corolla then having its petals tightly twisted together up to their middle, with the tips spreading. The next morning, about 9 a.m., before the blind was drawn up, the corolla was widely expanded and fragrant, the room being very dimly illuminated, this morning also being sunless and very gloomy, and the temperature below 60° Fah. I have now (Sept. 28, 1927) repeated the above experiment with the same result. How do these and other plants know when it is time to open their flowers? For in the case of this species it seems evident that it is not strong light or sunshine that causes it to expand its flowers, but that it is influenced in some mysterious way by the time of the day. Yet certain other species of this genus will only expand their flowers in bright sunshine, and not at all on a dull day, and even on sunny days will not fully open them unless the temperature is 70° Fahr. or higher.

24. *G. linguiforme*, K.E.Br., in The Gardeners' Chronicle, 1921, Vol. LXXI, p. 327 (Fig. 8.)-- Growths more or less pressed upon the ground, with the leaves usually edgeways to the sky. Leaves in two ranks, 2-3 inches long, 14-16 lines or more broad, 4-5 lines thick, tongue-shaped or somewhat oblong and slightly narrowing towards the apex, usually straight and widely spreading, sometimes slightly up-curved edgeways, flat on the face and one leaf of a pair usually with an oblique ridge or keel near the apex, obliquely convex on the back, the upper edge being very acute and somewhat cartilaginous, and the lower edge thickened and obtuse, especially in the larger leaf of a pair, and at the base on the upper side, where pressed against the young leaves, are usually raised slightly and sharp at the edge, but the raised part does not form a pustule; surface smooth

17 and shining, without elevated surface-cells, as seen under a strong lens, deep green. Flower sessile. Calyx large, somewhat 3-4-angled, unequally 4-lobed; lobes broadly ovate, the two outer acutely keeled and the inner two with large, membranous margins. Corolla about 2 inches in diameter, spreading in the morning; corolla in 1-2 series, rather lax, about 17-18 lines long and 14-15 lines broad, cuneately linear, obtuse and toothed at the apex, yellow on both sides, shining. Stamens very numerous, yellow. Stipes 10-11 spreading, 18 line long, plumose.

Lesqueranthemum linguiforme, Linn., Gr. Fl., ed. 1, p. 473 (1757), and ed. 2, p. 679, founded upon *L. folio scalloso*, Dillen., Hort. Eth., p. 225, t. 127, f. 224; L. E. Gr., in Journ. Linn. Soc., Bot., Vol. III, p. 50, not of other authors. *L. scallosum*, Haw., Obs., p. 137 (1825), Misc. Bot., p. 32, Syn. Fl. Succ., p. 220, and Rev. Fl. Succ., p. 94; Salm Dyck, Mes. 8, f. 1. *L. linguiforme* var. *scallosum* Berger, Mes. und Fort., p. 245, f. 31, copied from Salm Dyck. And probably *L. lucidum*, Will. Diet., ed. 2, p. 43 belongs here, as he quotes Burnefort's description for it, which seems clearly to indicate this species as being it and not the plant to which Haworth applied the name of *L. lucidum*.

South Africa: Locality and collector unknown. In cultivation in 1714 according to Aiton.

Although this is one of the oldest known species of the genus and still in cultivation, there appears to be no record of its re-discovery since the time when Dillenius described and figured it in 1732. It is nearly allied to *G. fragrans*, but is easily distinguished from that and all others by the very sharp, knife-like upper edge of the leaves, especially of the larger leaf of each pair, and the absence of raised, transversely-elongated surface cells, such as exist on *G. fragrans* as seen when viewed with a strong lens. Fig. 8 is made from a living plant.

25. *G. fragrans*, Schwantes, in Zeitschr. f. Sukkulantenkunde, Vol. II, p. 241 (Figs. 9, 10 and 11).-- It will normally grow erect and clustered. Leaves about 3 pairs to a growth, in two ranks, and sometimes more or less depressed edgewise to the soil, exceedingly variable on the same plant at different periods

14 of its life, sometimes on South African plants only 8-20 lines long, 6-11 lines broad and $4\frac{1}{2}$ -6 lines thick, ovate or roundish-ovate, flat on the face and very convex on the back, rounded, obtuse or subacute at the apex, being somewhat like half-an-egg in form, developing from this up to 3 inches long and 8-14 lines broad somewhat tongue-shaped, straight or curved edge-ways, flat (or towards the tip of the longer leaf of a pair somewhat concave) above, convex beneath, narrowing from about an inch below the apex to a rounded or blunt point, which in the longer of each pair is produced beyond the flat or concave face; sometimes where the flattened part ends (caused by the pressure of the smaller leaf upon it in bud) the longer leaf is somewhat hooked. Flowers sessile. Calyx in mature bud 9-12 lines in diameter, compressed-triangular, subequally 4-lobed; lobes 4-5 lines long, 3-4 lines broad, ovate, two of them acute and two very obtuse, with broad membranous margins. Corolla 22-34 lines in diameter, compressed-triangular, subequally 4-lobed; closed at night and lasting about a week, fragrant; petals numerous, in about 2 series, finally rather lax, 11-12 inch long, 1-1 $\frac{1}{2}$ line broad, cuneately linear, obtuse and minutely toothed at the apex, bright clear yellow on both sides, shining. Stamens numerous, about 4-5 lines long, at first erect and clustered, but when the stigmas

14 expand they become spread out into a ring. Stigmas yellow, 8-10,
Mesembryanthemum fragrans, Selin Dyck, Obs. Bot., p. 8 (1820),
and Mes. 8, f. 2; Link and Otto, Ic. Fl. Sel., p. 83, t. 43; New.
Rev. Fl. Succ., p. 95; Bot. Mag., t. 3934. M. linguiforme var.
fragrans, Berger, Mes. und Fort., p. 2 42.

Ladismith Division: Klein Karoo; Flathuis region; Fole Evans,
Nuir 3907, Swellendam Division: On the Bokkeveld shales and in rock
crevices at Koenie Kuilen, at about 1800 feet elevation, flowering
in April, Nuir 3293, Originally raised from South African seeds at
Carlsruhe Botanic Garden in 1816.

In my former account of this genus in The Gardeners' Chronicle,
1921, Vol. LXXI, p. 327, I suggested that this might be the same as
G. depressum, but now that I have seen more material of it I believe
that it is quite distinct.

Different individuals of this species differ widely and would
doubtless be often mistaken for distinct species, and it is rather
unfortunate that when the Botanical Magazine plate was published that
an unpublished drawing of the very same individual made in 1919 (two
years earlier than that of the published plate) was not also includ-
ed on the plate to show the great vegetative variation of this spe-
cies. When I first received a plant of Nuir 3907 it was so very di-
fferent in appearance from G. fragrans that I certainly mistook it
for a new and very distinct species, the leaves being small and
ovate, as shown in Fig. 9, the young pair, having their flat faces
obliquely towards each other, the inner pair being rather smaller than
an inch long, the outer pair being rather larger. Dr. Nuir informs
me that a number of such growths are formed upon the top of a root-
stock forming a hemispherical mass 4-6 inches in diameter, with
leaves pointing in all directions. Under cultivation, however,
it becomes G. fragrans.

Fig. 10 represents a plant at rest as it grows in South Africa
in a very dry season, showing the ovate leaves and an expanded cap-
sule, natural size, but the leaves are, of course, now long dead
alive. Fig. 9 is from a similar living, imported plant, showing the
ovate leaves as they developed at Kew. Fig. 11 is from a photograph
taken by my daughter of a plant cultivated by myself, natural size.

H. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III: 83: 49. 1928).

(Continued from page 14.)

12.--GLOTTIPHILLUM, HAM.

- 49 25. G. Neilii, H.E.Br. (Fig. 34).-- Stemless, each native-
grown plant consisting of only one or two very short upright stems
an inch in height and 1½-2 inches across the full spread of the
leaves. Growths more or less depressed towards the ground. Leaves
under natural conditions in 1-2 pairs, or under cultivation 3 pairs
to a growth, two-ranked or with the pairs placed somewhat obliquely
to each other; on native grown plants 4-1½ inch long, 9-18 lines
broad, and 4-7 lines thick, becoming under cultivation up to 2½
inches long, 18 lines broad and 6-8 lines thick, varving from some-
what square to oblong or obliquely oblong-ovate, subtruncate or broad-
ly rounded at the apex, sometimes one leaf of a pair has a very short

49 acute point at the apex of the upper margin, flat or slightly convex on the face, with a transverse keel near the apex on one leaf of a pair, formed by pressure against the shorter opposing leaf, convex, or with a very oblique longitudinal obtuse keel on the back; at first the leaves are microscopically ciliate on the surface and back, but afterwards the cilia fall off; leaves soft with fleshy; surface smooth, glabrous, chalky-green and more or less suffused with rosy and purple when fully exposed to the sun; native grown plants when received had the very young leaves and the flat face and basal part of the back of the older leaves of a pinkish or light purplish tint blending into the greyish-green or glaucous-green of the apical part, not dotted. Flowers sessile. Calyx unequally 4-lobed, glabrous; lobes 4-6 lines long and 4-5 lines broad, or perhaps larger (only one dried flower seen), the pair with broad, membranous margins. Corolla apparently 2 1/2-2 3/4 inches in diameter; petals in about 2 series, an inch or more long, 1/2-2/3 line broad, as seen dried, linear, obtuse, yellow. Stamens 2 lines long, apparently of a paler yellow than the petals; filaments not inserted. Ovary 1/2-3/4 inch long, 1/4 inch broad, yellow. Style 1/2-3/4 inch long, 1/4 inch broad. Capsule 1/2-3/4 inch in diameter when closed, with 7-8 valves and cells; valves reflexed when expanded, about 3 lines long and 2 lines broad, deltidial, 1/2-3/4 inch apart at the base, stout, obtusely rounded along the top and sides in summer, the valves in winter, the cells in summer wings, dark brown; cells roofed with somewhat stiff, dark brown cell-wings, and the opening nearly closed by a large pale brown tubercle. Seeds 1/2-line in diameter, compressed, roundish in outline with a small nipple, minutely tuberculate, dark opaque grey-brown.

Prince Albert Division: Karoo, near Prince Albert, growing among stones of its own colour, Neil van der Bijl.

This very distinct species was first sent to me by Mr. H. S. Pillans and afterwards by Mrs. D. van der Bijl, who informed me that it was discovered as above recorded by her son, Lester Neil van der Bijl, after whom I have much pleasure in naming this remarkable species, which I understand is of a little known form and colouration being so very different from the usual long narrow leaves of the genus. I am also indebted to Mrs. van der Bijl for a dried flower of it, from which the above description is made, for neither of my two plants have flowered, probably owing to want of sun last year.

This is remarkably distinct from all other species of this genus at present known, and can be instantly recognised by its short broad leaves and their peculiar opaque, chalky-green or greyish-green ground colour in summer, tinted with pinkish or purplish. The colouration of plants fully exposed to the sun or native-grown plants is quite pleasing and very different from that of all its allies. In the winter, under my sunless conditions, the leaves become green.

Fig. 34 represents an entire plant as received from South Africa, and a leaf from another plant after it had been in cultivation a year, both of natural size. It has the appearance of being a species that increases very slowly.

27. *G. ochraceum*, N.E.Br., in The Gardeners' Chronicle, 1922, Vol. LXXI, p. 21.-- Stems forming a matted mass, prostrate, 2-edged, with internodes up to one inch long, purple, finally whitish, and

49 branches with tufts of a few pairs of leaves at their ends. Leaves opposite, spreading, usually $1\frac{1}{2}$ - $1\frac{1}{2}$ but sometimes (according to Berger) 3-4 inches long, 2-3 lines broad and 2-2 $\frac{1}{2}$ lines thick, flat above, with subacute edges, bilobely keeled throughout on the back, with one side convex and the other flat or slightly concave, acute or obtusely pointed, soft and flexible, pulpy, smooth, glabrous, green, slightly shining, obscurely pellucid-dotted when viewed with a lamp against the light. Flower solitary. Pedicels usually $1\frac{1}{2}$ -2 $\frac{1}{2}$ (but according to Berger sometimes 3-4 inches long, slightly compressed and $1\frac{1}{2}$ line broad and 1 line thick, glabrous, light green. Calyx very unequally 5-lobed down to its union with the ovary, which is shortly obovoid, slightly compressed and 3 lines in its broader diameter; the two lower lobes 1 $\frac{1}{2}$ lines long, leaf-like, longer than the petals; the three shorter lobes 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ lines long, with broad, membranous margins, acute. Corolla about 1 $\frac{1}{2}$ inch in diameter, expanding in sunshine in the morning, closing in the afternoon; petals 50-60, in about 2 series, free, 2-3 lines long and 1-1 line broad, generally lighter, pinkish, of a regular buff or ochraceous colour, with a faint coppery tint. No staminodes. Stamens numerous, erect, about 2 lines long; filaments white; anthers yellow. Stigma 5-10, about 1 line long, plumose, acute. Ovary flattish on the top, 7-10-celled. Fruit not seen.

Mesembryanthemum ochraceum, Berger, Mes. und Port., p. 234 (1908).

South Africa: Locality and collector unknown.

My first description of this plant was copied from that of Berger, but the above is made from the living plant, which I find is cultivated in several gardens in England, under the name of "*Mesembryanthemum humile*," as quoted by Berger. I have not seen any plant of it with leaves and pedicels as long as Berger describes them to be, nor do I find the stigmas to be 5 as he states. This plant appears to be infertile to its own pollen, at least, I have as yet failed to obtain fruit of it, and until that is obtained and examined the correct genus to which this plant belongs cannot be determined, for I doubt if it is really a species of *Glottiphyllum*.

Doubtful Species.

Mesembryanthemum heterophyllum, Haw, Obs., Append., p. 420 (1895), Misc. Nat., p. 36, Syn. Pl. Succ., p. 225 and Rev. Pl. Succ., p. 101, and M.E.Pr. in The Gardeners' Chronicle, 1892, Vol. LXXII, p. 22, not of Andrews.--Of this plant I know nothing, and can have only repeat what I have stated at the place above quoted, viz.: This is quite an unknown plant whose position is doubtful. It most certainly is not at all the same as *M. angustum* var. *heterophyllum*, Haw., with which it has been confused by Goulet and Berger. It is originally described by Haworth as follows: "I have seen a fine stemless *Mesembryanthemum* with various shaped greenish impunctate leaves, the lower ones somewhat like those of my canum, the upper or inner ones somewhat like those of *diffusum*, but not quite so large." In his Misc. Nat., p. 36, he adds: "I once saw two plants of this fine species alive in the collection of Messrs. Malcolm, nurserymen at Kennington." As he gives no further information about it in any of his works and no drawing is known to exist of it, the above is all that is known concerning this plant. Although associated with species of *Glottiphyllum* by Haworth, I am doubtful if it belongs to this genus. It may have been an immature

49 plant of some other known species of this or another genus, for in a young state some members of this group are very different from their adult form.

Mesembryanthemum surrectum, Haw., Rev. Fl. Succ., p. 101 (1821) (Fig. 35).-- Leaves decussate, suberect or spreading, semiterete-subulate, acute, soft, usually pustulate at the base. Ovary exserted, subnunculate.-- Berger, Mes. und Fort., p. 236.

Var. B. Leaves shorter, more spreading.

The above is Haworth's description of this plant, which he states was in Kew Gardens in 1819, and is all that has hitherto been known of it. At Kew, however, there is a drawing of the type plant (of which Fig. 35 is a copy), labelled: "Raised in the year 1817 from seeds collected at the Cape of Good Hope by Mr. Bowie." From this drawing I glean the following particulars. Leaves opposite, united at the base and the pairs crossing one another at right-angles, 2-2½ inches long, about 5 lines broad, except at the base, where they are dilated, and 4-5 lines thick, semicylindric, flat on the face, with sharp edges, very rounded on the back, tapering above the middle to an obtuse or subacute apex, green and apparently glabrous and shining, not dotted.

This plant does not appear to belong to the genus *Glottiphyllum*, and it is hoped that by means of Fig. 35, which is copied from the drawing of the type, it may be rediscovered.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 83: 128. 1928.

(Continued from page 49.)

12.--GLOTTIPHYLLUM, HAW.

Additional Species.

127 *G. regium*, N. E. Br. (Fig. 66).-- Growths, as received, erect, forming clumps, each with 1-2 pairs of leaves, which, in the younger stages, are closed together so as to resemble a large beak of a bird and perfectly erect in the specimens seen; long, the large beak of a bird and perfectly erect in the specimens seen; the larger leaf of each pair varies from 1-4 inches long, 6-11 lines broad and 6-10 lines thick at the base, the other leaf being 4-8 lines shorter and not so thick, but according to Dr. Muir these dimensions may be far exceeded, as he stated that he found leaves on wild plants in a very dry season up to six inches long. They are flat, or the smaller leaf slightly convex on the face, and there gradually tapering to a subacute apex in the larger leaf, and to a rounded apex in the smaller one. The larger leaf is of about the same thickness throughout, rounded at the apex in side view, rounded on the back at the lower part, and compressed and obtusely keeled at the upper part, while the smaller leaf is usually thinner and sometimes flattened, and at others keeled at the apical part; surface smooth, without the transverse cells that some species have, glabrous and without microscopical cilia on the edges, light green, suffused with red where exposed to full sunshine. Pedicels 6-10 lines long, longer than when in fruit. Calyx very unequally 4-lobed; the larger lobes 9-10 lines long and 6-7 lines broad, ovate, acute, keeled on the back, without cilia on the keel; the broader

- 123 lobes 5-6 lines long, orbicular, with broad, white, membranous margins and a dorsal point. Corolla only seen in a withered condition; petals 10-11 lines long and 2/5-1 line
- 124 broad, linear, obtuse, yellow. Stamens pale yellow. Stigmas 8, not in a fit state for describing. Capsule, when closed, 9-10 line in diameter, obconic, with 8 sutural ridges 2 1/2 lines high on the otherwise flattish top, and with 8 valves and cells; valves suberect when expanded, and the capsule then 13-14 lines in diameter, pale ochreous; expanding-keels half as long as the valves, widely separated at the base and diverging, with acute edges, dark brown, without points or marginal wings; cells acutely roofed with stiff cell-wings and with a large pallid tubercle at the opening. Seeds 1/2-line long, ovoid, with a slightly incurved point at one end, tuberculate, with the tubercles on the back, longer than broad and papilla-like brown.

Cudtshoorn Divison: On stony plains near the Gamka River, Muir 4192.

This is the most striking species of the whole genus that has yet been discovered, and I think its discoverer is right in calling it "The King of the Genus." As there has been a drought for about two years in the region where it grows, and yet the leaves are so large or larger than represented in my sketch (Fig. 66), I anticipate that in a more abundant state they will become more robust, and possibly prove to be the largest in the genus.

(To be continued.)

LEUCODRYAETHETUM.

Gard. Chron. III. 83: 194. 1928.

(Continued from page 124.)

The following are a few supplementary genera from among those that I left to be dealt with at the time of publishing my previous keys until the material necessary to make a sufficiently perfect description should be available, and also descriptions of additional species and corrections belonging to the genera already dealt with.

SYNOPSIS, N. E. Br.

Biennial or annual. Root stout, fleshy, branching. Leaves opposite or alternate, not united at the base (as is stated in books). Inflorescence cyme, sometimes solitary, pedicellate. Calyx obconic, acutely 5-angled on the ovary part, and the angles with or without small teeth scattered along them, unequally 5-lobed down to its union with the ovary. Petals numerous, free. Stamens numerous, erect, filaments slender. Stigmas 5, subulate, overtopping the stamens. Ovary inferior, shortly conical and 5-angled at the top, 5-6 celled; placentas on the outer walls of the cells. Capsule large, obconic, 5-angled, and with 5 valves and cells; valves without expanding-keels and marginal wings, flattish within, not expanding by being wetted, but separating and spreading so when the capsule is ripe and dry, and remains so without closing again; cells deep, open, without cell-wings or tubercles, and the thin cell-partitions rising in a conical manner much above the level of the bases of the valves. Seeds compressed, somewhat kidney-shaped, tuberculate.

The only known species is *C. trinolium*, N. E. Br. a native of

194 the Cape Division of South Africa,.

The name is derived from the Greek, *gymnos* bare, and *poda*, a lid, because the valves of the capsule are destitute of expanding-keels and marginal wings.

The true position of this very distinct genus, which I have not yet seen alive, is somewhat doubtful, but I place it between *Crokytum* and *Cernanthes*, because its habit and foliage is similar to that of those genera on their allies, although the structure and appearance of the flower and fruit is entirely different. In this genus the expanding keels of the valves of the fruit are aborted, so that there is no mechanism for opening and closing the valves, as in most of its allies. When ripe and dry the valves separate and spread out, and never close again; water has no influence upon them.

195

1. *G. tripolium*, N. E. Br.-- Glebrous in all parts. Flowering stems arising from a radical tuft of leaves, 3-9-inches long, decumbent, with distinct internodes. Leaves lanceolate and reticulate or spatulate-lanceolate, acute or obtuse, 2-7 inches long, 4-18 lines broad, with the petiole channelled, dilated and sheathing at the base, but when opposite not united there. Pedicels erect in flower and fruit, 1-2½ inches long. Calyx with the two larger lobes 5-6 lines long, deltoid-ovate, acute, the other three shorter, broadly ovate or sub-orbicular, with membranous margins and a dorsal point. Corolla 12-15 lines in diameter, "opening in the middle part of the day, and of short duration," according to Haworth; petals linear, acute, 4-6 lines long, ½ line broad, not, or but slightly, longer than the calyx-lobes, white. Stamens 10. Stigma overtopping the stamens. Capsule 10-11 lines in diameter, obconic, 5-angled; valves spreading 2½-3 lines long, and 2-2½ lines broad at the base, deltoid, smooth and creamy-ochraceous within; cells about half-an-inch deep, with thin and stiff pallid cell-partitions, rising perfectly erect in the form of a acute cone, without cell-wings. Seeds one line long, tuberculate, black, otherwise as described under the genus.

G. tripolium, Linn., Sp. Pl. ed. 1. p. 481 (1753), founded upon Dillen, Hort. Elth., p. 320, t. 179 f. 220; Haw. Obs., p. 122 and 443, Misc., p. 49, Synon., p. 247, and Rev., p. 103; G. L. Syst., Dec. 564, f. 1; Persar, Mus. p. 42 and 43, f. 1. (The fruit figured as *G. tripolium* in Brian, Guide to River Park, p. 12, belongs to *Cernanthes nemorosum*, and that figured in The Garden, 1871, Vol. LXIV, p. 7471, under the same name is a Composite, *Centocaryum pygmaeum*, O. Hoffm., the wellknown "Ragwort" or "Ragwort"). Thunb. Fl. Cap., p. 415, not of Linne.

Cape Division: In damp sandy places in various parts of the Cape Peninsula, Wolley Dod 3509, Bolus 7930, Pillans, Plouetberg Division, Fichtelberg 1880, Pearson 5280, Glenwillow Division: Oliphants River Valley, near Farm 60th, Stephens 7170.

According to information received from Mr. Pillans and recorded upon labels with specimens, this plant grows in damp places and in a sandy soil, so that under cultivation it should receive more water than most of these plants require, and probably a good sandy loam would suit it best. As it is a biennial, it must be propagated from seeds.

N. E. Brown
(To be continued.)

PUNCTILLARIA, N. E. Br.

6. *P. Dekenahi*, N. E. Br.-- Leaves 1-2 pairs to a growth, ascending - spreading, or at spreading, 12-3 inches long, 8-13 lines broad at the middle, 4-6 lines thick at the base and curved to one side, so that the flat or slightly concave upper side is more or less falcately sub lanceolate (or less commonly straight and lanceolate) in outline, acute or obtuse, rounded on the back at the base, strongly keeled and compressed, and with slightly concave sides at the apical part, where, in side view, one leaf is more obtuse or rounded into the apex than the other of each pair; smooth glabrous, reyish-green, slightly tinged with rose on the angles on the imported plant, and thickly dotted with dark green, the dots not being prominent. Flowers solitary, not seen. Pedicels of capsules 5-6 lines long, with a pair of bracts at the base, which are probably partly included between the bases of the leaves when in flower. Capsule, when closed, 5-6 lines in diameter, hemispherically obconic, partly superior, slightly depressed on the flattened top, with the sutures of its 10-12 valves slightly raised, dull brown; when expanded about an inch in diameter, with the valves slightly recurved, and the whole interior dull blackish-brown; extending like the standing apart and slightly diverging, or subparallel, scarcely half as long as the valves, stout, with rounded sides, acute (but not curved) at the apex, not winged; cells acutely roofed with very stiff cell-wings that are turned back at the opening like the mouth of a trumpet, and the opening partly or nearly closed by a blackish-brown, compressed tubercle. Seeds few in a cell, about $\frac{1}{4}$ - $\frac{1}{2}$ line in diameter, compressed, roundish in outline, with a small point, microscopically tuberculate, blackish-brown.

Fraserburg Division: Near Fraserburg, Dekenah in Herb. Muir 4102.

Described from a living plant sent to me in November last by Dr. J. Muir. I have not yet seen its flowers, but they will be described later. This new discovery, however, is easily distinguished from its allies by its falcately curved leaves.

In the *Zeitschrift für Sukkulentenkunde*, 1927, p. 10, Schwantes has united the genus *Punctillaria* with *Fleiospilos*, because he states that the capsules of these two genera do not differ, and that in those of *Fleiospilos Bolusii* and *P. simulans* there is a small tubercle present at the opening of the capsule, but that it is covered by the cell wings, and that I am mistaken in supposing it to be absent. But here, as in so many other cases, I find he is far more eager to claim authorship than to make careful investigations, and so has created much useless synonymy, for besides the fruit I previously examined, I have before me as I write between twenty and thirty capsule of *P. Bolusii* and several of *P. simulans* that I myself picked from living imported plants, not one of which possesses any tubercle, small or large, such as is found in the capsules of *Punctillaria* (*ortata*, *marginata*, *occidens*, *oleacea*) that I have examined. From this, I can only suppose that the capsules examined by Schwantes were either from hybrid cultivated plants or from some that were wrongly named, they certainly could not have been from any true *Fleiospilos*, if his statement is correct. Besides the character

216 of the absence of a tubercle at the opening to the cells, the capsule of *Pleiospilos* also differs from that of *Punctillaria* by the much longer arm to the expanding-keels and the manner in which the marginal wings extend along it, as is clearly shown in my illustration of the generic characters in *The Gardeners' Chronicle*, 1926, Vol. LXXI, n. 88, f. 50, as compared with those of *Punctillaria* on pl. 212, f. 104, of the same volume. There is also the difference in foliage.

P. compacta, H. E. Br., in *The Gardeners' Chronicle*, 1926, Vol. LXXI, n. 228. In Dryander's manuscript notes at the British Museum, I find it recorded that *Meesebryanthemum compactum*, Wit. flowers at Dur in November, 1791, that its flowers are yellow, and the leaves as long and as thick as a finger." Dryander's MSS. description, translated, reads as follows:-- "Stemless. Leaves connate, dotted, semiterete, triquetrous and somewhat reflexed at the apex, acute. Flowers sessile; calyx subcylindric, six-lobed." All this quite agrees with the plant I have described as *P. compacta* which is also cultivated as *M. nobile*. But Schwantes, without giving the slightest reason for so doing or indicating how they differ or can be identified, has given them separate names. Therefore to the synonymy of this plant must be added: *Pleiospilos compacta*, Schwantes and *P. nobile*, Schwantes, in *Zeitschr. f. Sukk.* 1927, p. 23.

N. E. Brown
(To be continued.)

MESEBRYANTHEMUM.
Gard. Chron. III. 85: 251. 1923.
(Continued from page 216.)

12a.--DIPLOSOMA, SCHWANTES.

251 Small, succulent perennials, stemless and deciduous, without evident rootstock, but with numerous short, fibrous roots from a dense cluster of sessile growths. Each growth formed of two opposite leaves, which are both sub-horizontally directed, and shortly and very obliquely united at the base and along the basal part of one margin, with the free parts diverging, soft and pulpy, withering completely away annually. Flowers solitary, terminal, sessile between the bases of the leaves, bractless. Calyx unequally 6-7-lobed. Petals numerous, in two series. Stamens numerous, erect, surrounded by staminodes. Stigma 2, erect, filiform. Ovary inferior, flat at the top.-- Schwantes in *Zeitschr. f. Sukkulent*, Vol. II, p. 170 (April, 1926).

Species two, native of South Africa, the type of the genus being *D. retroversum*, Schwantes.

The derivation of the name is not stated, but is doubtless from the Greek, *diplos*, double, and *soma*, body, in allusion to the 7-lobed body formed by the partial union of the basal part of the leaves.

The author of this genus has founded it without giving any generic characters or the slightest indication of how it differs from other genera, and evidently he has never seen the genera, and evidently he has never seen the plant he founds it upon. But as it is clearly a good genus, I have done the best I can to formulate generic characters for it from Mrs. Bolus' description and figure of the type species, and from a living plant of a second species of which I have

251 not seen flowers. As the description of the flower of both species is very incomplete, and (apart from stating that the cells have no cell-wings and the placentas are on the outer wall) the structure of the fruit is undescribed, its real affinity is not certain, but as in general appearance it more nearly resembles the genus *Glottiphyllum* than any other at present known, I place it next to that genus, from which the filiform stigmas and the presence of staminodes exclude it.

If I am correct in assuming (as from the evidence I have seen I believe I am) that the leaves of this plant die away annually, it is the third known genus in this group of plants that is known to be deciduous, or in which the leaves die and wither annually, even if they do not fall off, the others being *Phyllobolus*, N.E.Br., and *Dactylopsis*, N.E. Br. There are, however, also members of the genera *Mesembryanthemum*, *Delosperma*, *Psilocaulon* and *Sceletium* in which the leaves die and persist or are deciduous annually; while in one species of *Amoebophyllum* they persist as spines.

Leaves united at the base on one side for nearly half their length, $2\frac{1}{2}$ -4 lines broad, marked with a few pellucid dots. 1, retroversum.

Leaves united at the base on one side for not more than one-quarter of their length, about 3 lines broad, marked with some linear blackish lines. 2, Leipoldtii.

1. *D. retroversum*, Schwantes, in *Seitschr. f. Sukkulent*, Vol. II, p. 179 (1926).-- Plant scarcely an inch high and as described in the generic characters. Leaves two only to a growth, 9-11 lines long, $3\frac{1}{2}$ - $4\frac{1}{2}$ lines broad and $2\frac{1}{2}$ lines thick, sub-terete, but slightly concave or flattened on one side, with rounded edges, slightly narrowing to the very obtuse apex, smooth, glabrous, green, with a few scattered pellucid dots. Flowers sessile, solitary, terminal. Calyx unequally 7-lobed (always?): ovary part depressed, sub-globose, constricted under the lobes, $2\frac{1}{2}$ lines in diameter; the larger lobes about $2\frac{1}{2}$ line long, acute; the other $1\frac{1}{2}$ line long, with broad membranous margins, obtuse. Corolla represented as about 5 line in diameter; petals numerous, in 2-series, $2\frac{1}{2}$ lines long and $1\frac{1}{2}$ -line broad, linear, acute, magenta. Stamens and staminodes numerous, up to 2 lines long. Stigmas 7, erect, 2 lines long, filiform. Ovary $2\frac{1}{2}$ and 3 lines in diameter on the top.

Mesembryanthemum retroversum, Kensit in *Trans. Roy. Soc. S. Afr.*, Vol. I, p. 150, pl 21, f. A.- 1-4 (1909).

Piquetberg Division: Near Endekuil, Pillans 995.

This curious little plant at present seems only to be known from the above description and figure.

2. *D. Leipoldtii*, L. Bolus, in *South African Gardening*, 1927, p. 270, pl. 1, f.-- Resembling *D. retroversum* in general habit, but the unequal leaves are narrower, 2-12 lines long, $2\frac{1}{2}$ -3 lines broad and nearly so thick, and are only very shortly united along one margin at the base above the sheath (not for nearly half their length), somewhat semi-terete, concave or flattened on the face, with blunt edges, very obtuse at the apex, slightly twisted, soft and puffy, smooth, glabrous, green, with a few scattered, short, linear, blackish-green markings. Flower not seen, but according to Mrs. Bolus, solitary, sessile or sub-sessile. Calyx unequally 6-lobed,

251 two of the lobes 5-6 lines long and the other four about 2 lines long, terete. Corolla about 10 lines in diameter. Stigmas represented as 7, subulate, acute, erect. Top of the ovary flat. The cells of the capsule are stated to have no cell-wings, and the placenta on the outer wall. No other details mentioned or figured.

Piquetberg Division: Between Endekuil and Grey's Pass, Leinoldt and Vaughan.

I received a living specimen of this very remarkable plant from Professor R. H. Compton in 1926, which, when it arrived, was at rest and entirely without any trace of leaves. It consisted merely of a dense cluster of dead sheaths surmounting a mass of short, fibrous roots. After some days, however, it put forth several pairs of leaves as described above which differed distinctly from those (as figured)

252 of *D. retroversum*, by being more slender, less united at the base, slightly twisted and marked with short, blackish streaks. Neither the twist of the leaf nor the blackish streaks upon it are mentioned by Mrs. Bolus, whether *D. retroversum* is so marked I do not know, no mention being made of the, but in my experience no other plant in the whole group of *Conophytum* such markings are to be seen has upon it. They are not the usual dots, but whether idioblasts or not I did not determine, as the plant unfortunately died without flowering; now that it is dead I realise that I killed it by keeping it too dry. It has very short roots and is evidently a surface feeder, obtaining, under natural conditions, sufficient water from the heavy dew to prevent its roots from drying up during the time it is at rest and leafless. When growing and flowering, however, it evidently requires a fair amount of water, and by treating it as I did my species of *Conophytum* I evidently did not supply it with a sufficient amount, so after a brave struggle it died. Examination after death proved that I had allowed its root-tips to become too dry. From this I infer that its pupy leaves evaporate much more water than a *Conophytum* or a *Lithops* does, and consequently the soil requires to be kept in a moister condition for this *Diplosoma* during its vegetative period. This experience may be useful to future cultivators who may obtain plants of this singular and interesting species, and I would recommend that the pot be stood in a saucer and watered when required by putting water in the saucer, so that there is always moisture ascending from the lower soil to the roots.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 80: 266. 1928.

(Continued from page. 252.)

12B.--STENROFETALUM, N. E. Br.

266 Stemless, perennial, tufted. Leaves opposite, shortly united at the base, sub-terete or somewhat semi-terete, smooth and dotless. Peduncle solitary, terminal at the side of a new pair of leaves, 1-3-flowered, the lateral flowers also on short, right after it has once expanded; petals numerous, in several series and passing into staminodes, narrow and stiff to the touch, all shortly united into a ring or tube at the base. Stamens connivent for half their length with the upper part, abruptly deflexed and tortuous, bearded at the basal part. Stigmas 5, ascending-reading. Ovary inferior,

266 flattish or very slightly convex on the top, 5-celled, with the placentas on the floor of the cells. Capsule shortly obconic, flattish at the top, and the sutures slightly raised at the central part only, with five valves and cells; valves recurving when expanded, with the expanding-keels continuous into a very stout, convex, central keel, with broad margin lines that are not united in pairs between the valves; cells imperfectly roofed with small, membranous and flexible cell-wings, whose edges do not meet, and without a tubercle on the outer wall. Seeds not seen.

The only known species is *S. Pillansii*, W.E.Br., a native of Little Namaqualand.

The name is derived from the Greek, *sterros*, stiff, and *petalon*, a petal, in allusion to the stiff petals, a character that is otherwise only known to occur in this family of plants in the genus *Dactyloctenium*, near which for the present I place it, although its foliage is quite different in type from the leaves of that unique plant. Fig. 130 represents a diagram of the structure of the flower, but with only two series of stamens shown in order to make their arrangement clearer.

1.-- *S. Pillansii*, W. E. Br. (Fig. 131.)-- Plant tufted, 2-3 inches high, glabrous. Leaves in 2-5 pairs to the root, sub-erect, to ascending-spreading, 12-20 lines long, 5-5 lines broad, and 3-4 lines thick at the base, slenderly linear-lanceolate, slightly narrowing upwards to a very obtuse apex, slightly convex on the face, with obtuse or rounded edges, very rounded and scarcely at all keeled on the back, nor compressed at the apex, firm, smooth, not dotted, glaucous-green or whitish-green. Peduncle erect, $\frac{1}{2}$ -1 inch long, compressed and 2-edged, about $1\frac{1}{2}$ -line broad, of a much paler green than the leaves. Bracts about six lines long, united at the base, resembling reduced leaves. Pedicels about 3 lines long, erect. Calyx produced above the ovary into a slight tube about $\frac{1}{2}$ -line long, with the ovary-part somewhat ovoid-conical, and the lobes like reduced leaves, the two longer are 5-6 lines long and the others 3-4 lines long, all ascending-spreading when expanded. Corolla 6-9 lines in diameter, not closing after it has expanded, but remaining open day and night, for three weeks or more, not scented; outer petals about $4\frac{1}{2}$ lines long and $\frac{1}{2}$ -line broad, arched-spreading and shorter than the calyx-lobes, narrowly linear-cuneate, sub-acute or obtuse with a small point at the apex; the inner gradually shorter, narrower, filiform and acute, less spreading, and the innermost connivent, filling up the central part of the flower so as to make it flat at the top and concealing the stamens, all of them quite stiff to the touch and united at the base into a very short tube about $\frac{1}{2}$ -line long, white, with a faint yellowish tinge at the central part of the flower; the innermost or staminodes are densely bearded and matted together at the middle. Stamens 1-1 $\frac{1}{2}$ lines long, filaments very slender at the deflexed tortuous part, white, anthers yellow. Stigmas 1 line long, stout, subulate, smooth, and green. Glumes none or obscure. Ovary green on the top. Capsule 2-3 lines in diameter when closed and 4 lines when expanded, dull brown shining, with the keels and principal veins of a lighter brown, otherwise as described under the genus.

Little Namaqualand: Locality unknown, Pearson, Pillans 5705.

This plant was sent to England in 1910 or 1911 by Professor Pearson, but never flowered. Last year I received it from Mr. W. B. Pillans, and as it has flowered, I am now able to describe it. In

266 foliage it somewhat resembles young plants of *Roodia digitifolia*, N.E.Br., but the leaves are more slender, and in its stiff petals and the long duration of its flowers it resembles those of *Dactyloctenium digitata*, N.E.Br. The development of its flowers has been exceedingly slow, possibly because the year was so sunless and cold. In September last, the peduncle bore one pedicellate flower between the two bracts at its top, and at the end of December, the second flower on the peduncle, developed from the axil of one of the bracts, and also with a short bractless peduncle and a pedicel of its own, was still in very immature bud. My sketch (Fig. 131) represents a growth of the plant in this state, with the decayed flower omitted.

H. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 83: 338. 1928.
(Continued from page 266.)

13.--*MESEMBRYANTHEMUM*, N. E. Br.

270 Dwarf succulent perennial, forming clumps, very pulpy. Leaves two or three to each growth, alternate, terete, very stout, with large, tubular sheaths clasping one another closely and encircling the short stem, soft and pulpy, dotless, withering completely and disappearing when at rest. Flowers terminal, solitary, sessile. Calyx produced above its union with the ovary into a short tube, equally 5-lobed above. Petals a short tube, numerous in several series, the inner (staminodes?) concealing the stamens, linear, stiff, united into a tube at the base and arising in the middle where the calyx unites with the ovary. Stamens numerous, erect, in 4 series, arising from the tube of the corolla and not exerted from it. Stigmas 5, subulate, acute; style none. Ovary half-superior, 5-celled; placentas axile; ovules numerous in each cell. Capsule half-superior, sub-globose, with the 5 sutures raised into broad ridges on the top, 5-celled; valves deltoid, with the expanding-keels contiguous at the lower part and these forming the cell-partitions, more or less diverging at the apical part, and there bearing broad, membranous, marginal wings or flats that are united in pairs between each pair of valves; cells open, without cell-wings or tubercles; the central axis ends in 5 short, hard rays arranged in a small star; these rays may possibly be abbreviated cell-partitions, as each ray arises from between the bases of a pair of expanding-keels, and occur in other genera. Seeds very small, many of them in each cell, compressed, ellipsoid, somewhat pointed at each end, and with a minute nipple at one end, smooth.-- N.E.Br. in *The Gardeners' Chronicle*, 1928, Vol. LXXVIII, p. 41; and in *Phillips' Gen. of S. Afr.*, Fl. Pl., p. 244.

Species 1, *D. digitata*, N. E. Br., a native of South Africa.

The name is derived from the Greek, *dactylos*, a finger, and *opsis*, appearance or likeness, in allusion to the finger-like leaves of the plant.

The very remarkable plant that constitutes this genus is distinguished from all others of the group, not only by its appearance, but by its very stout and very pulpy alternate leaves, which are absent or completely withered when the plant is at rest; by its petals being remarkably stiff and united at the base into a tube,

338 and by the character of its ovary and fruit. Fig. 160 represents diagrammatically the floral structure made from a living flower. Fig. 161 is from a photograph of my plant in a state of rest, with a dead flower upon one of the growths, natural size, taken by my daughter. In this state it somewhat resembles the pseudo-bulbs of an Orchid. Fig. 162 is from a photograph by Mr. T. N. Leslie of the plant as it grows in South Africa (and with myself) in flower, natural size.

It is interesting to note how completely this plant changes its appearance, as is shown by these figures. When in vigorous growth and flowering its appearance is as shown in Fig. 160, but when it goes to rest the stout pulpy leaves and their sheaths dry up and disappear, becoming a mere brown skin enclosing the short pulpy stem of each growth, as shown in Fig. 161.

1.-- *D. digitata*, N. E. Br. (Figs. 160, 161 and 162).-- Plants with one, forming large clumps up to a foot in diameter. Rootstock and its fleshy roots descending deeply, stout, divided or branching above, the branches being mostly underground, and 2-4 lines thick. Each growth, 1½-3 inches high and 1-1½ inch thick, soft and fleshy, with 2-7 alternate short and long leaves that are very unequal, 1-3 inches long and 4-10 lines thick, terete or finger-like, very obtuse, smooth, glabrous, very pulpy, green or glaucous-green, and under continued sunshine tinted with purple at the tips. Flowers solitary, sessile, terminal. Calyx not exserted, from the last sheath, about 4½ lines in diameter, sublobed at the lower part, green; tube above its union with the ovary 1½-2 lines long; lobes 2-3 lines long and 1-2 lines broad, ovate or rounded, obtuse, sub-membranous. Corolla 2-3 lines in diameter, remaining continually expanded for 3-4 weeks irrespective of cloud or sunshine; tube about 3 lines long; petals very numerous, in several series, linear-filiform, rather stiff; the outer about 5-6 lines long, recurve, spreading, greenish; the inner about 1-1½ line long, erect or incurved, concealing the stamens, white or pale yellowish. Stamens in 4 series, included in the corolla-tube, creamy-white. Ovary half or rather more than half-superior, superior, conical, above, creamy-white. Style 1½-2 lines long, stoutly subulate, acute, creamy-white. Capsule sub-globose, with 5 garing, sutural ridges on the top, 2½-4 lines in diameter when closed, and 5-6 lines in diameter when expanded, with the whole inner surface creamy-white or pale ochreous. Seeds 1-2/3 line long, light brown.

Mesembryanthemum digitatum, Ait. Hort. Kew, ed. 1, Vol. II, p. 121 (1789); Haw. Obs. p. 179 (1795), Misc. Nat., p. 27, Synops. Fl. Succ., p. 211, and Rev. Fl. Succ., p. 86; Berger, Mes. un d. Hort., p. 229, f. 47 (copied from a drawing by Masson). *M. digitiforme*, Thunb. in Acad. Leop.-Car. Ephem., Vol. VIII, Append., p. 6 (1791), and Fl. Cap. ed. Schultes; p. 412; Karloth, Fl. S. Afr., Vol. I., p. 201, t. 49, Fig. G., and in Trans. Roy. Soc. S. Afr., Vol. 1, p. 497; Pole Trans. Flowering Pl. of S. Afr., Vol. III, t. 102 (section of flower very inaccurate); N.E.Br. in Bothalia, Vol. 1., p. 153.

Van Rhynsdorp Division: Karoo between the Olifants River and the Bokkeveld Mountains, Thunberg, Masson, Pearson 3,458, Mrs. Wood Karloth.

This singular plant was introduced into Kew Gardens by Francis Masson in 1775, but seems soon to have died out of cultivation, for Haworth stated that he had never seen the plant. -- parently nothing

339 has been known of it in Europe for over 150 years. Therefore only those who are really fond of plants may sense or understand the delight and gratification I felt upon receiving unexpectedly from Mrs. E. Rood a living specimen of this very remarkable plant, of which I had read and have seen a drawing, but never hoped to possess. Only they may realize the very great disappointment it was to me to find that the bulk of the plant, although preserving its shape, was a mass of rotten pulp. However, as I noticed that two of the growths had firm central cores, I held the plant under a running water-tap, and with a soft brush cleared the whole of the rotten part away, dried the remainder of the plant with a soft cloth, and then placed it in a corner of the warm tiled hearth in front of the dining-room fire and kept it there for three days. Finding the cores were then dry and firm, I planted it in dry sand in a small pot, and placed that pot half-buried in a larger pot of earth. The earth in the outer pot was watered from time to time, but I never watered the sand in which the plant was actually placed. The moisture from the outer pot supplied all that the plant needed, and in a month it had put forth roots, when I reotted it in a different soil, and in due course it developed leaves and flowered. From this plant I have therefore been able to give particulars of the structure of its flowers and fruits. Alas, that plant only lived to flower once, the damp atmosphere of a sunless, cold and wet year proved to be fatal to it.

At the British Museum and at Kew there are fine drawings (both alike) made by Masson of the plant as he found it growing in South Africa. These drawings represent a clump of the plant thirteen inches in diameter, of which a small portion has been copied and reproduced on a reduced scale by Berger, as above quoted. Masson's drawing has been thought to be an exaggerated representation of the plant, but my plant and one of which I have a photograph taken in South Africa has had leaves as long and as thick as those represented by Masson, so probably the plant he portrayed had received a larger amount of rainfall that year than usual, thus inducing a luxuriant growth. Masson figures the flowers of normal size.

This plant is remarkable in several of its characteristics. In the first place, when the plant goes to rest, the leaves and their thick pulpy sheaths wither and shrivel to a mere skin, soft and friable, and brown in colour, through which, after a period of rest, the new growth bursts. The duration of the flower s (3-4 weeks) so far as known to me, are almost unique in this group of plants, only one other genus (*Sterro-petalum*), havint these characters. Another interesting feature is its peculiar anatomical structure. Each growth consists of a short stout stem, 1-2 inches long, enveloped by the thick sheaths of the leaves. The central part consists of a stout cylinder of dense, fleshy tissue composed of minute cells, and is somewhat firmer than the other parts of the plant. This cylinder is surrounded by a single layer of large elongated cells, colourless and watery, all arranged at right angles to the axis, and all so large as to be clearly visible to the naked eye, a type of structure I have not seen before. This layer of large colourless cells is represented at a in fig. 100. The whole of this is enclosed in the tubular sheaths of the leaves so as to be invisible without dissection. A transverse section of the leaf is quite circular in outline, the central part of it consists of a mass of clear, watery tissue, with air cavities and slender vascular fibres scattered throughout it. At the outer edge of this

340

clear tissue, where it unites with the chlorophyll (or other) tissue, the vascular fibres fork and unite with other fibres, so as to form a network. The chlorophyll tissue forms an outer layer several cells in depth, but the cells are irregularly intermingled, not disposed in regular layers. The epidermis smooth, becoming slightly glaucous, but under a microscope the outer surface of each cell is convex.

N. E. Brown
(To be continued.)

MESEBRYANTHEMUM.

Gard. Chron. III. 87: 419. 1928.
(Continued from page 340.)

14.--ASPAZOMA, N. E. Br.

419 Succulent, perennial, bushy, branched. Leaves more than two to a branch, some alternate and others opposite, seritenerate or subtriconous, always with a tubular sheath, embracing the branches or the sheath above, and nearly or quite as long as the internodes. Flowers terminal, solitary. Calyx spread above its union with the ovary into a distinct tube, unequally 4-5-lobed above, with 2 lobes linear, the other short and broad. Petals numerous, linear, in 2-3 series, apparently united into a short tube at the base. Stamens and staminodes numerous, erect, possibly connivent into a cone? Stigmas 4-5, subulate. Ovary conical at the top, (probably 1-2-carpel, but too crushed to decide), 4-5-celled; placentae axile. Capsule not seen. -- N. E. Br., in *Ann. S. Afr. Mus.*, 1925, Vol. III, p. 244, and in *Phillips, Gen. of S. Afr. Fl. Pl.*, p. 244.

The only species is *A. amplexans*, N. E. Br., the type of the genus, a native of Namaqualand region.

The generic name is derived from the Greek, *aspaizomai*, to embrace, in allusion to the tubular sheaths of the leaves which embrace the stem.

1. *A. amplexans*, N. E. Br., in Phillips, *Gen. of S. Afr. Fl. Pl.*, p. 244.-- Plant about 5-6 inches high. Leaves 7-18 lines long, with tubular sheaths about $\frac{1}{2}$ -inch long. Calyx-tube enclosed in the sheaths of the uppermost leaves, globose-obconic, villate. Corolla about $1\frac{1}{2}$ inch in diameter, pale straw-coloured.

Resemb. *amplexans*, L. Bolus in *Ann. S. Afr. Mus.*, Vol. II, p. 153 (1913).

Little Namaqualand; on stony slopes of hills near Daunabis. *Ann. S. Afr. Mus.*, Vol. III, p. 244; *Phillips, Gen. of S. Afr. Fl. Pl.*, p. 244. Mountains N.E. of Walle Areal, *Phillips* 17, 907.

This is a remarkably distinct plant of dwarf, bushy habit, quite unlike any other in the group. I have not seen it alive.

15.--MOEBOPHYLLUM, N. E. Br.

Perennial succulents, with distinct internodes. Leaves alternate, sessile, withering and persisting as sharp spines, or the basal part only persistent as a hardened fragment. Flowers terminal in lax bracteate cymes, pedicellate. Calyx slightly produced above its union with the ovary into a short tube, 5-lobed above. Petals numerous, united at the base into a short tube, and arising around

419 the top of the ovary, not at the top of the calyx-tube. Stamens numerous, collected into a cone, surrounded by spreading staminodes, arising from the tube of the corolla and deciduous with it. Stigmas 5, subulate. Ovary half or less than half-superior, 5-celled; placentae axile. Capsule half or more than half-superior, with 5 valves and cells, only an immature specimens seen; valves with the expanding-keels contiguous into a central keel, and with a broad, marginal inflexed wing on each side. Seeds several in a cell, immature in the specimen seen, compressed, minutely tuberculate.- N. E. Br. in The Gardeners' Chronicle, 1925, Vol. LXXVIII, p. 40, and in Phillips, Gen. of S. Afr. Fl. Fl., p. 244.

Species 3, natives of Demaraland and Namacrusland, the type of the genus being *A. angustum*, N.E.Br.

The name is derived from the Greek, amoibe, alternation, and phyllon, a leaf, in allusion to the leaves being alternate. Mrs. Bolus in South African Gardening, 1927, Vol. XVII, p. 364, gives a different derivation, as if seeking to claim the genus as her own, since no mention is made of its place of publication or its author.

In the Genera of South African Plants, my description of the corolla, stamens and stigmas were partly based upon the flower of *A. rangei*, in as I have not seen *A. angustum* with these organs in perfect condition, but Mrs. Bolus, who, I have slightly modified the above description in accordance with the flower of the living plant, but there seems to be no difference of generic import. Also, upon further examination, of the only fruit I have yet seen, I am doubtful if my statement that the wings of the valves are really united in pairs is correct; the fruit is a damaged one and glued to the sheet on which it is mounted, and by repeated wetting the wings have either become free or were only held together by a little glue, as I now suspect. As I have not seen any living plant of this genus I am unable to illustrate it.

1. Leaves 5-9 lines broad, ovate-lanceolate, acute; green parts coarsely papillate. 3, Gurichianum.

Leaves $\frac{1}{2}$ -2 $\frac{1}{2}$ broad, linear, linear-lanceolate or subulate and drying spine-like. 2

2. Leaves $\frac{1}{2}$ -1 line broad, sub-terete or subulate, very acute, persisting as stiff spines; calyx-lobes spine-tipped; green parts minutely or finely papulose. 1, angustum.

Leaves 11-21 lines broad, linear or linear-lanceolate, in the specimens seen only the basal part persistent as stiff broken fragments; calyx-lobes not spine-tipped; green parts coarsely papulose. 2, Rangei.

1. *A. angustum*, N. E. Br., in Phillips, Gen. of S. Afr. Fl. Fl., p. 245.-- A bushily-branched plant, probably about a foot high; branches stiffly erect, those seen (dried) 3-7 inches long, about 2-2 $\frac{1}{2}$ lines thick, slightly tinged, with internodes 1-2 lines long, glabrous and minutely papulose on all green parts. Leaves alternate, 8-15 lines long, $\frac{1}{2}$ -1 $\frac{1}{2}$ line broad or thick, subulate or sub-terete, very acute, and persistent as sharp, stiff spines, spreading and upcurved, usually with leafy buds in their axils. Cyme terminal, lax, up to 2 $\frac{1}{2}$ inches in diameter, 3-5-flowered, bracteate. Pedicels 2-3 lines long, 11-13 lines thick below, expanding upwards. Ovary with the ovary-part oblong, 3-5 lines in

419 diameter; lobes with spine-like tips from a dilated base, the three longer up to 6-7 lines long, and the shorter and one of the longer with broad, membranous margins at the basal part. Petals and stamens not seen in perfect condition, but according to Mrs. Bolus, "the flowers open during the day and remain open late in the evening, with pale rose petals fading to a salmon-pink; numerous stamens more or less collected into a cone, and a few radiating staminodes with abortive anthers"; the corolla is stated to be about 9 line lines in diameter, with the petals in two series and 5 lines long. Stigmas 5, "filiform, 2' lines long." Capsule more than half-superior, depressed sub-globose, 5-ridged on the top, otherwise as described under the genus.

A. roseum, L. Bolus, in South African Gardening, 1927, p. 364 and 365, f. 15.

Little Namaqualand: near Silverfontein, 2,500-3,000 feet alt., Drege 2,935. Copperberg, Pillans 5,741.

A remarkably distinct plant, distinguished from all others of this alliance by its rather stout, stiffly erect branches and alternate, sessile leaves, which wither and become spines.

I think the two following species belong here, but until all three have been examined and compared in a living state, their position cannot be definitely determined.

2. *A. Rancei*, N. E. Br.-- A perennial, bushy succulent, up to one foot high, coarsely villate on the upper parts; leaves erect, stout, about 2' lines thick (dried), apparently succulent in the upper part, glabrous. Leaves alternate, only a few of the uppermost seen, sessile, about 6-8 lines long and $1\frac{1}{2}$ -2 $\frac{1}{2}$ lines broad, linear or linear-lanceolate, acute, apparently concave-channelled above, and slightly convex on the back, after withering, apparently only the basal part persists as a stiff, broken fragment. Flowers in lax terminal cymes about three inches in diameter. Pedicels about 2 lines long. Calyx-tube obconic, produced above its union with the ovary into a very short tube about 1-line long, unequally 5-lobed above, the 3 larger lobes 5-8 lines long and 2 $\frac{1}{2}$ -5 lines broad at the apex (dried), ovate, the apices acute or sub-obtuse point; the 2 other lobes with broad, membranous margins and a dorsal, acute point 1-2 lines long. Corolla apparently, about 1 inch in diameter; petals numerous, in 2-3 series, each 5 lines long, the 1 line broad, narrowly linear, united at the base into a tube, $1\frac{1}{2}$ line long, possibly white? Stamens numerous, in several series, arising from the tube of the corolla and not longer than it. Filaments short, apparently insensate. Stigmas 5, short 1-line long, unilobate. Ovary partly superior.

Great Namaqualand; Reis Flats, near Letterkopp, about 2,600 feet alt., Rance, 1,056.

3. *A. Gurichianum*, N. E. Br.-- Plant strongly or coarsely villate. Leaves alternate, 9-14 lines long, 5-9 lines broad, ovate-lanceolate, acute. Flowers in terminal cymes, many-late. Calyx 5-lobed; lobes very unequal, 3 larger than the others, all acuminate. Corolla 7 lines or more in diameter; petals rosy. Stamens numerous, included. Stigmas short. Ovary ovate, half-superior, 5-celled. *Desembryanthum Gurichianum*, Fax in Engler Bot. Jahrb., Vol. XIX, p. 133 (1894).

Namaland: near Anichob, by the river Ugab, Gurich 75.

This species is only known to me from the very imperfect description of which the above is a translation, from which I think it must

419 belong to the genus.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 84: 13. 1928.
(Continued from page 419, Vol. LXXXIII.)

SPHALMANTHUS, N. E. Br.

13

Succulent perennials, pulvose on all the green parts. Rootstock tuberous or fleshy. Stems prostrate, herbaceous, or becoming woody at the base. Leaves alternate or opposite, or those on the flowering part alternate and the remainder opposite, sessile, semiterete. Flowers solitary and terminal, or by the growth of an axillary branch or branches, 2-6 to a stem and becoming one by one lateral and opposite the leaves, or in lax terminal leafy or bracteate cymes, pedicellate. Calyx produced above its union with the ovary into a short tube, or subequally 5-lobed nearly down to the ovary; lobes with leaf-like tips. Petals numerous, in 3 or more series, united into a short tube at the base, passing into stamens. Stamens numerous, arising from the tube of the corolla, erect, in several series. Style long; stigma 2-lobed. Ovary mostly superior, or inferior, 5-celled with cells 11-celled. Capsule half superior, the upper part very convex or dome-like, with much raised sutures, when young smooth and transparent so that the seeds within it may be seen in the type (but perhaps not in all) species, with usually 5, sometimes 4, valves and cells; valves widely spreading or recurved; expanding-keels, contiguous, forming a central keel, united at the base to the septa and so forming the cell-partitions, with broad, erect and flap-like marginal wings unfolded upon them; cells smooth without cell-wings or tubercles. Seeds compressed, rounded or horse-shoe-shaped in outline, usually tuberculate (1 large).--
N. E. Br. in The Gardeners' Chronicle, 1925, Vol. LXXVIII, p. 453.

Species 13 or more, natives of South Africa. The type is *S. canaliculatus*, N. E. Br.

The name is derived from the Greek, *anthos*, a flower, because these plants have small flowers, and in the genus *Mesembryanthemum*.

Sphalmanthus differs from *Cryophytum* by its perennial habit and tuberous rootstock, and from *Aridaria* by its tuberous rootstock, prostrate stems, more pulvose leaves, which are mostly alternate on the flowering part, and rather different flowers, otherwise the general structure of these three genera is similar. I do not know if the upper fruit of all the species is transparent so that the seeds may be seen within it, as it is in *S. canaliculatus*, but if it is, this very remarkable character will be an additional distinction.

As the species of this genus are seldom cultivated, I am not able to make a workable key of them, and may only indicate them by the colour of their flowers, which is variable in some species, and as I have not a living flower of the type species, my sketch (Fig. 8) of the flower structure is made from one of *S. fragilis*.

Petals entirely white or whitish.

1, *S. canaliculatus*, 2, *S. salmoneus*, and see 10, *S. commutatus*.

Petals white at the upper part, purple at the base.

Petals pink or purplish, or salmon-coloured.

1, *S. canaliculatus*, 2, *S. salmoneus*, 5, *S. tenuiflorus*,
5, *S. carneus*, 8, *S. latus*.

Petals straw-yellow, or yellowish-buff.

10, *S. commutatus*: 7, *S. fragilis*, 9, *S. Rebei*.

Petals yellow.

11, *S. longispinulus*: 12, *S. caudatus*: 13, *S. grossus*.

Petals green.

4, *S. viridiflorus*.

1. *S. canaliculatus*, N. E. Br.-- Stems prostrate, sometimes rooting at the nodes, and up to two feet or more long, $\frac{1}{4}$ -1 line thick, with internodes $\frac{1}{2}$ -2 inches long, terete, papulose, producing short leafy branchlets or short or elongated flowering branchlets, but commonly bearing the flowers in a terminal cyme. Leaves 4-8 lines long, about 1 line thick, semi-terete, channelled on the upper side, not at all united at the base, sub-acute, glabrous, papulose; crowded on the short branchlets, distant on the main stems. Flowers in terminal cymes $2\frac{1}{2}$ -9 inches across, or solitary, or scattered along the branches opposite the leaves, or axillary. Pedicels 2-7 lines long. Calyx more coarsely papulose on the lower part than on other parts of the plant; ovary-part 3-4 lines in diameter; lobes 3-6 lines long, two of them leafy from an ovate base, the others with broad, membranous margins and shorter points. Petals 6-8 lines long, $\frac{1}{3}$ line broad, linear, obtuse, varying from white to pink. Stamens about two lines long. Stigmas usually 5, sometimes 4, erect, $1\frac{1}{2}$ -2 lines long, filiform. Capsule $2\frac{1}{2}$ -3 lines in diameter when closed, and 4-5 lines when expanded, entirely pale ochreous within, otherwise as described for the genus, and before it is ripe smooth and transparent, so that the seeds may be seen within it, as indicated by Haworth.

S. calycinus, L. Bolus in Sth. Afr. Gardening, 1887, p. 398 and 399, f. 21A, a very poor figure without a description. *S. canaliculatus*, Haw. Obs., p. 218 (1793), Misc. Bot., p. 27, 300, p. 255, and Rev., p. 177. *M. rapaceum*, Jacq. Prodr., p. 1, t. 52, f. 1. (1804) or later) *M. calycinum*, Echl. and Ley. Enum. Pl., p. 319 (1835), not of Haworth. *M. salmoneum*, Salm Dyck, Mes. 56, f. 2. Sondl. in Fl. Cap. Vol. III, p. 451; Berger Mes. und Fort., p. 71, not of Haworth. *M. longispinulum*, Sondl., Fl. Cap., Vol. II, p. 449 (excluding the words "flowers pale yellow," and the reference to Salm Dyck, both of these belonging to *S. commutatus*, N. E. Br.) not of Haworth.

At New there is an excellent drawing of the type of *M. canaliculatum*, Haw., from which I find that the plant Salm Dyck has figured as being *M. canaliculatum*, and that all subsequent authors have mistaken for that species, is distinct from it. I also find that the plant figured by Salm Dyck as being *M. salmoneum* is really the same as the true *M. canaliculatum*, Haw. From which I think it most prob-

13 able that the two plants figured by Salm Dyck really represent the two species *M. canaliculatum* and *M. salmoneum*, but that the names in some way were transposed, and that the figure of the type of *M. salmoneum*, but Salm Dyck's figure of *M. canaliculatum*, was placed with Aiton's description of *M. salmoneum*, and differs from *M. canaliculatum* by its Pear-shaped, not sub-globose ovary.

N. E. Brown.
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 84: 34. 1928)

(Continued from page 13.)

SPHALLANTHUS.

- 34 2. *S. salmoneus*, N. E. Br. = *M. salmoneum*, Haw., Rev., p. 176; N. E. Br. in Journ. Linn. Soc., Vol. XLV, p. 174; not of Salm Dyck, Sonder or Berger. *M. canaliculatum*, Salm Dyck, Bot. Beech., f. 1; Sond. in Fl. Cap., Vol. II. p. 450; Berger, Mes. und Fort., p. 72, f. 11, II, not of Aiton. See note under *S. canaliculatus*, N. E. Br.

The flowers of this species are stated to be "at first fulvous or salmon-coloured, yellow at the base, afterwards paler to rosy, and finally rosy outside and more or less whitish within."

3. *S. tenuiflorus*, N. E. Br.-- Leaves 1½-2½ inches long, spreading or recurved; calyx-lobes longer than the petals; corolla purple, closing every evening, = *M. tenuiflorum*, Jacq. Fragm., p. 44, t. 52, f. 3 (1804 or later); Haw., Suppl., p. 94, and Rev., p. 177.

Sonder, and Berger following him, have considered this and *S. viridiflorus* to be one species, apparently without paying any attention to the distinctive characters represented or given to them by Jacquin, which I here add.

4. *S. viridiflorus*, N. E. Br.-- Leaves 4-11 inch long, ascending or ascending-spreading, calyx-lobes shorter than the petals, corolla green, perianth green above and white below. *viridiflorus*, II. Hort. Kew., ed. 1, Vol. II, p. 196; Haw. Obs., p. 199 and 443, Misc. Nat. p. 56, Synop., p. 253, and Rev. p. 177; Jacq. Fragm., n. 47 t. 52, f. 2; DC. Fl. France, t. 186; Bot. Beech., t. 186; Salm Dyck, New., t. 54, f. 5.

5. *S. carneus*, N. E. Br. = *M. carneum*, Haw., Obs., p. 206. *M. gracium*, Haw., Obs., p. 255, Misc. Nat., p. 56; Synop., p. 253; and Rev., p. 176; Salm Dyck, New., t. 54, f. 2; Sonder in Fl. Cap., Vol. II, p. 449; Berger, Mes. und Fort., p. 66, not of Aiton.

6. *S. oculatus*, N. E. Br. = *M. oculatum*, N. E. Br. in Kew Bull., 1911, p. 313, and Journ. Linn. Soc., Vol. XLV, p. 120.

7. *S. fragilis*, N. E. Br. = Rootstock more or less tuberous or thick and fleshy, divided. Stems prostrate, 4-8 inches long, 1½ line thick at the young or green parts, with internodes 3-9 lines long, and when young and on all other green parts papillose, becoming greyish and withered in appearance when old, glabrous, very brittle.

34 Leaves alternate or some of the lower opposite, a scending-spread-ing, 6-10 lines long, $1\frac{1}{2}$ -2 lines broad and $1-1\frac{1}{3}$ lines thick, gradu-ally tapering from the base to an acute or obtuse point, flat with obtuse edges on the face, rounded on the back, not keeled, soft and pulvy with the papulae often linear-oblong in outline as seen with a lens, green. Flowers 3-6 or perhaps more, in lax terminal cymes. Pedicels 4-6 lines long, upcurved, terete, thickening into the o-vary. Calyx 5-lobed, with the papulae coarser in the ovary part than on the lobes, glabrous, the longer lobes $4\frac{1}{2}$ -8 lines long, $1-1\frac{1}{2}$ line thick, and usually longer than the petals, the others shorter, all leaf-like. Corolla 8-9 lines in diameter, expanding in the morning loosely irrespective of sunshine if it is not too cold at night; petals loosely arranged in 3-4 series, forming a flattish flower, the outermost about 5 lines long and $1\frac{1}{3}$ -lines broad, the inner gradually shorter and narrower, passing into staminodes, linear, the outer obtuse or truncate, the inner acute, all of a peculiar pale buff or between pale straw and pale buff colour. Inner staminodes erect, closely surrounding and overtopping the sta-mens in 3 lines long, slightly recurved at the tips, pale yellowish. Stamens in several series one above another in a cone within the staminodes; the inner about $\frac{1}{2}$ -line long; filaments not bearded, a-bout whitish; anthers bright yellow. Stigmas 5, about $\frac{1}{2}$ -line long, terete, erect and recurved at the tips. Ovary inferior, shortly convex at the top, 5-celled; placentas axile.

Little Namaqualand: In the Richtersveld, Pillans, 5734.

Described from a living plant sent to me by N. S. Pillans. My sketch of the floral structure of the genus (Fig. p. 13) was made from this species.

8. *S. laxus*, N. E. Br. = *Aridaria laxa* L. Bolus in South Afr. Gard., 1927, p. 433, f. 26, C.,

9. *S. Rebei*, N. E. Br. = *Aridaria Rebei*, L. Bolus in South Afr. Gard., 1927, p. 433, f. 23, D.

10. *S. commutatus*, N. E. Br. = *M. commutatum*, Berger in Engl. Bot. Jahrb., Vol. LVII, p. 631 (1922). *M. longispinulum*, Salm Dyck, Mes., 54, f. 4; Berger, Mes. und Fort., p. 68 and 67, f. 10, II, not of Haworth.

11. *S. longispinulus*, N. E. Br. -- Tuber growing partly above ground, 9-10 lines thick. Stems 4-6 inches long, procumbent. Leaves alternate, 8-10 lines long, and about 1 line thick, semi-terete or channelled above, very acute or almost spine-pointed, absolutely papulose, green, withering into small spines 3-4 lines long on the basal part of the branches. Flowers terminal, soliter-y, on stout pedicels 3-4 lines long, thickened upwards. Calyx 5-lobed; ovary part 5 lines long, $4\frac{1}{2}$ -5 lines in diameter; lobes sub-equal, varying in different flowers from $2\frac{1}{2}$ -6 lines long, leafy. Corolla 12-14 lines in diameter, expanding in the morning; petals very numerous, in several series, narrowly linear, passing into staminodes, light yellow. Stamens slightly and gradually spreading, of a darker yellow than the petals. Stigmas 5, erect, shorter than the stamens, dark yellow. Ovary 5-celled.

M. longispinulum, Haw., in Phil. Mag., 1824, Vol. LXVI, p. 426, not of Salm Dyck, Sonder nor Berger.

As this plant has been misunderstood by all authors, I give the above description of it, partly compiled from Haworth's original description and partly from a good coloured drawing of the type

35 plant preserved at Kew and labelled "Raised in 1821 from seeds collected at the Cape of Good Hope by Mr. Bowie, and named *M. longispinulum*, New., in Phil. Mag." This drawing represents a plant that is probably four to five years old, and is most probably made from the very plant that Haworth described, for it quite corresponds with his description. But there is also another drawing at Kew bearing the record "*Mesemb. longispinulum*, New., in Phil. Mag., p. 426. Raised in 1824 from seeds brought from the Cape of Good Hope by Mr. Bowie." This latter plant has large and very different whitish flowers from those of the true *M. longispinulum* and may possibly be a fellow seedling to the plant Saltn Dyck has figured as *M. longispinulum* (Mes., 354, f.4), which was evidently sent to him by Aiton under that name instead of the true *M. longispinulum*. The colour of the flower probably varies, as in other species, for the yellow colour depicted by Saltn Dyck is of a much deeper tint than I have ever seen it, or than in the New drawing, which represents the flowers as creamy-white. This drawing with whitish flowers was probably not made until 1825 or later, as Bowie did not return from the Cape until August, 1823, and the plant being raised in 1824 (when Haworth published his description) would not be likely to flower in that year.

12. *S. caudatus*, N. E. Br. = *M. caudatum*, L. Bolus in Ann. Bolus Herb., Vol. II, p. 29.

13. *S. grossus*, N. E. Br. -- This has a stout, ovoid, tabular base, from which arise stout, decumbent branches $1\frac{1}{2}$ -4 inches long and 2-3 lines thick, with a mass of sessile or short-stemmed leaves and flowers at their ends. Leaves 6-10 lines long and $1\frac{1}{2}$ line thick, sub-terete, but flattened on the face, incurved-spreading, obtusely pointed or sub-acute, papulose. Flowers subsessile or on pedicels 1-2 lines long. Calyx unequally 5-lobed, papulose; lobes $1\frac{1}{2}$ -3 lines long, sub-acute. Petals numerous, in 2-3 series, united below into a short tube, linear, obtuse, yellow. Stamens numerous, arising from the corolla-tube. Style 1, spreading, 1-line long, rather stout. Ovary half-superior, 5-angled. Young fruit dark red at the top. *M. grossum* Ait. Hort. Kew, ed., 1 Vol. II, p. 191, not of other authors.

The above description is compiled from drawings made in 1776, preserved at the British Museum, which demonstrate that it is a totally different plant from that which Haworth and others have mistaken for it.

N. E. Brown
(To be continued.)

MESEMBRYANTHEUM.

Gard. Chron. III. 84: 128. 1928.

(Continued from page 35.)

17.--CRYOPHYTUM, N. E. Br.

128 Annual or biennial herbs, one species perhaps perennial, covered with watery and often glittering papulose. Stems and branches with distinct internodes, often prostrate. Leaves alternate on the flowering branches and opposite at the base, or all opposite, sessile or petiolate, flat or sub-terete. Flowers solitary and opposite; the leaves scattered along the branches, or axillary, or

128 in cymes. Calyx produced above its union with the ovary into a short, distinct tube and 4-5-lobed above, or lobed nearly or quite down to its union with the ovary; two of the lobes often large and leafy. Petals numerous, slender, linear or linear-filiform, united at the base into a short, distinct tube and arising around the top of the ovary. Stamens numerous, erect, arising from the corolla-tube; filaments several times as long as the anthers. Stigmas usually 5, rarely 4, erect, filiform. Ovary partly or more than half-superior, usually 5, rarely 4-celled; placentas axile. Capsule with 5, rarely 4, valves and cells; valves with the expanding-keels contiguous, forming a central and often acute keel, with a broad inflated or erect sub-oblongous flange or wing on each side; cells open, without cell-wings or tubercles. Seeds numerous in each cell, small, compressed, somewhat T-shaped, very minutely tuberculate or smooth.-- *Fl. de la Barbadoe*, 1793, Vol. I, LXXVIII, p. 412, and in Phillips, *Gen. of S. Afr. Fl. Pl.*, p. 246.

Species several, natives of South Africa, the Mediterranean region, Arabia, Persia, Beluchistan, Kurdistan and Atlantic islands, and naturalised in California.

The generic name is derived from the Greek, kryos, ice, and phytion, a plant, because the well known "Ice-plant" (*C. crystallinum*, N. E. Br.) is the type of the genus.

The illustration of the generic structure (Fig. 54) is drawn from a flower of *C. grandiflorum*, N.E.Br., which is nearly allied to the type.

It would appear that the broad, wing-like margins of the valves of the capsule in this genus (as in others of similar structure) develop so as to enfold some of the seeds between themselves and the expanding keel of the valve, and when the rain soaks in so as to wet the expanding-keels and cause the valves to open, these wings clasp some of the seeds so that they are torn from their funicles (stalks) and may then be easily washed out of the capsule by the rain. A very ingenious and effective arrangement, ensuring the easy dispersal of the seeds, and widely different from the structure of the capsules and mode of dispersal of the seeds in such genera as *Cerianthes* and *Glottiphyllum*, where every precaution seems to exist to prevent the seeds from getting out of the cells of the capsule, although they certainly do become dispersed, but I have failed to discover how.

Few species are in cultivation, as most are not showy plants, and those that are, being annuals or biennials (although *C. Barklyi* appears to be of longer duration), require to be renewed from seeds, which does not always ring in the British Isles. On the Continent they do not do better. Therefore, as I am unable to give a key to all the species from living material, I merely give a list of the species described with descriptions of some that are incompletely described, and the new ones that I place under this genus, arranged according to the order of the leaves and colour of the flowers. As in previous genera, the letter E in the synonymy stands for *Esembryanthemum*.

2.--FLOWERS WHITE.

1.-- *C. Aitonis*, N. E. Br.-- *C. Aitonis*, *Secq.*, Hort. Vind. Vol. III, p. 3, t. 7; *Haw. Misc. Bot.*, p. 48, Synop. 247, and Rev. 158; *Berger, Mes. und Fort.*, p. 39. *C. angulatum*, *Thunb. Prod.* 91, and *Fl. Cap. ed. Schult.* 426; *Berger, Mes. und Fort.*, 36; N.E.Br.

128 in Bothalia, Vol. I., p. 145; Schoenl., in Trans. S. Afr. Phil. Soc., Vol. II., p. 37, t. 2, f. D. H. Volckameri, Haw. Obs., p. 426, and Rev. 159. *M. lanceolatum*, Haw. Misc. Nat., p. 45, Synop., 245, and Rev. 15, including varieties; Berger, Mes. und Fort., p. 34. *M. crystallorhizae*, Tschl. und Seyl. Bot., p. 122; Salm Dyck Mes., § 60, f. 2.

South Africa: Uitenhage Division: Zwartkops River, Zeyher 1078, 2623, 2625. Albany Division: near Grahamstown, Mac Owan, Herb. Austr. Afr., 1875. Cradock Division: near Portimer, Tensit in Herb. Bolus 9305.

Introduced into cultivation by Messon in 1795.

2.-- *C. Burchellii*, N. E. Br.-- Haworth gives the following description of this plant, which is at present unknown:-- Root sub-biennial, . . . branches suberectly ascending, paniculate, with the branches acutely appressed and rather . . . Leaves ovate, reticulate, the uppermost subalternate, lanceolate, glabrous-apiculate, acutely . . . Flowers paniculate, small, sessile, white. . . W. Burchell from seeds he collected in South Africa.

Mesemb. sessiliflorum var. album, Haw. Suppl. Pl. Succ., p. 93, and Rev., p. 158; N. E. B. in Journ. Linn. Soc., Vol. XLV, p. 154.

Gracoff Reinet Division: by the Sundays River, near Monkey Ford, Burchell.

No specimen or drawing of this plant appears to have been reserved. Berger (Mes. und Fort., p. 34) places it as a synonym of *M. clandestinum*, but it is obviously quite distinct pedicillate flowers and different leaves.

3.-- *C. clandestinum*, N. E. Br., not of L. Bolus.--This small and rather insignificant species is well described and figured by . . . but the fruit has not been described, so I add the following details concerning it.

Capsule 2-2½ lines in diameter when closed, sub-globosely near-shaped, half-superior, with 5 valves and cells; when expanded about 3½ lines in diameter, with horizontally spreading valves, entirely pallid within, the structure as for the genus, with the . . . D-shaped, very minutely sub-tuberculate, brown.

M. clandestinum, Haw. in Phil. Mag., 1826, p. 129; Salm Dyck, Mes. § 60, f. 4.; Berger Mes. und Fort., p. 34, f. 3. *M. alsinifolium*, Don in Lond. Hort. Brit. ed. 1830, p. 480.

South Africa, precise locality unknown. I have only seen cultivated specimens of this plant.

N. E. Brown
(to be continued.)

MESE BRYANTHEUM.

Gard. Chron. III. 84: 153. 1928.

(Continued from page 128.)

17.--CRYOPHYTUM, N. E. Br.

153 4.-- *C. conjectum*, N. E. Br. = *C. clandestinum*, L. Bol. in S. Afr. Gard., 1927, pp. 326 and 327, f. 11, E. Not *M. clandestinum*.

Of this species Mrs. Bolus gives no description, and figures

153 only a seed and two valves of a capsule, which most certainly do not represent the seed and valves of the true *C. clandestinum*, N. E. Br. I have therefore changed the name, but a proper figure and description of the plant are needed.

South Africa: Montagu Division: near Montagu, collector not stated. Bolus Herb., 15357.

5.-- *C. crystallinum*, N. E. Br., in Phillips, Gen. S. Afr. Fl. p. 245; S. Afr. Gard., 1938, p. 83, f. 21.

= *M. crystallinum*, L. Sn. Fl., p. 480, founded upon Dillen. Hort. Elth., p. 231, t. 180, f. 221; Haw., Obs., 113 (*crystallinum*) and 433, Misc. Nat. 43, Synop. 243, Suppl. 91, and Rev. 157; Mill, Edden, p. 200 t. 25, f. 1; DC., Fl. Gr., t. 128; Berger, Mes. und Fort., p. 35; Baill., Dict. Bot., Vol. II, p. 609; Gaertn., Fruct., Vol. II, t. 126. Plenck, Ic., Vol. IV, t. 297; Lam., Ill., t. 438, f. 3; Vitz., Ic. Fl. Med., Vol. VIII, t. 656; Sibth., Fl. Graeca, Vol. V, t. 481; Rev. Hort., 1860, p. 151, and 1903, p. 525; Berg., Charakt., t. 60, f. 460; Cusin et Ansbergue, Herb. Fl. France, Vol. VIII, Ficoid, t. 2; Garden, 1877, p. 281; with fig.; Pouchet The Universe, ed. 5, p. 284, with fig.; Karst., Deutsch Fl. Pharm.-Med. Bot., p. 528, and Fl. Deutsch., Vol. II, p. 62; Hoffm., Pflancenatl., t. 41; f. 256; English Fl. Gard., t. 168; Vilm.-Andr., Fl. Potag., p. 249; Fiori et Paol., Ic. Fl. Ital., p. 122; Beih. Bot. Centralbe, 1901, Vol. I, p. 178; Coste, Fl. France, Vol. II, p. 122; Reichenb., Ic. Fl. Germ., Vol. XXIV, t. 155; Warburg, Pflanzenw., Vol. 1, p. 555; Trotter, Fl. Econ. Libia, p. 146; Armstrong, Field Book West Wild Fl., p. 109; Bailey, Cyclop. Amer. Hort., p. 1,003 and Standard Cycl. Hort., p. 2,043. Vers. annum and vienne, DC., Prof., Vol. III, p. 448. *M. glaciale*, Haw., Suppl. p. 92, and Rev. 157.

South Africa: Occurs in several of the coastal divisions from Cape Division to Uitenhage Division, or perhaps further eastward, where it seems to be a native. It is also found along the coastal area of the Mediterranean, and in the Canaries, but has probably been introduced into these areas. It is stated to have been in cultivation before 1727, and is sometimes eaten as a vegetable or salad.

6.-- *C. grandiflorum*, N.E.Br. (Fig. 54, p. 128)-- Annual or biennial, glabrous, covered with glittering papulae on all green parts. Leaves of the central rosette opposite, in four ranks, those on the branches alternate, all spreading, petiolate; petiole 1-2 inches long, 2-4 lines broad, concave above, not sheathing and very slightly united at the base; blade 1-5 inches long, 1-2 inches broad, ovate-lanceolate to lanceolate, acuminate, sub-cordate or tapering into the petiole at the base, flattish or concave, with red at the apex and edges. Flowering branches axillary from the central rosette, ascending or decumbent, 2-24 inches long, 2-4 lines thick, with internodes 1-3 inches long, and ending in a lax cyme of 2-9 flowers, or the flowers scattered along the branches opposite the leaves, bracteate. Pedicels (above the bracts) 3-18 lines long, 1½-2 lines thick. Calyx unequally 5-lobed, with the tube above the ovary 1 line or less long; the three larger lobes 5-7 lines long and 3-3½ lines broad, oblong or ovate, acute, the other with broad, membranous margins. Corolla 1½-2½ inches in diameter, open during the day, closing at night, and having a faint and not quite pleasant odour; petals very numerous, in 5-6 series, irregularly bent or contorted, giving a ragged appearance to the flower, united below into a tube

153 2 $\frac{1}{2}$ -3 lines long, and the outer 10-12 lines long, about 2-line long, filiform-linear, acute; the inner gradually shorter, passing into staminodes, white, with the basal part and the staminodes lemon-yellow or pale greenish-yellow, giving that tint to the centre of the flower. Stamens numerous, erect; the outer 4-5 lines long, lax; the inner gradually shorter and connivent, or densely clustered around and pressed against the stigmas, the innermost about 2 lines long; filaments very minutely scabrid, not bearded, white; anthers yellow. Stigmas 4-5, filiform, 3-2 $\frac{1}{2}$ lines long, erect, with recurved tips, not quite equalling the longest stamens. Ovary nearly or quite superior, 5-celled, green. Capsule more than half superior, with 4-5 valves, which rise to 3 $\frac{1}{2}$ -4 lines above the base of the calyx-lobes, pale ochreous, with the gaping sutures or edges of the valves blackish-brown, uniformly pallid inside, and 6-9 lines in diameter when expanded. Seeds $\frac{1}{2}$ -line in diameter, much flattened, triangular in outline, with a small hump on one of the sides, not tuberculate, of a peculiar and somewhat dull bronzy brown.

M. crystallinum var. *grandiflorum*, Eckl. and Zeyh., Enum. Pl., p. 321; Sond. in Fl. Cap., Vol. II, p. 453.

South Africa: Prince Albert Division: Near Abraham's Arsal, Mrs. D. van der Bijl. Riversdale Division: Common in the district, Muir 3898, 3899; Zeyher, 2097. Orange River Region, Shaw, Miss Wilman.

B.-- Flowers probably white, but colour not stated.

7.-- *C. Fenchelii*, N. E. Br.-- A stout herb, probably biennial, glabrous. Leaves in a central radical tuft, opposite, flat, petiolate, 1 $\frac{1}{2}$ -3 inches long and $\frac{1}{2}$ -1 $\frac{1}{4}$ inch broad, ovate, acute, papillate. Flowering stems produced from below the rosette of leaves, prostrate or ascending, stout, terete, up to a foot or more long and 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ lines thick, papillate, ending in lax cymes. Pedicels $\frac{1}{2}$ -1 inch long. Calyx produced above the ovary into a short tube, unequally 5-lobed above; lobes 4-6 lines long, broadly ovate, with acute or subulate tips. Petals very numerous, apparently about 8-9 lines long, but perhaps longer, united into a short tube at the base.

M. Fenchelii, Schinz, in Bull. Herb. Boiss., Vol. V, Append. III, p. 79 (1897).

Great Namaqualand: East of Keetmanshoop' Fenchel, 172. And probably the following also belong her:-- Tsooschaub, Rautenan 41, Belck 69, Dinter 950, Usakos, Schinz 917, as they all appear to be the same species as the type.

The actual type consists of a flowering branch only, which has been browsed by an animal and is branching again, no radical leaves are present, so that in the above description these organs are described from the other specimens quoted, whose leaves on the flowering branches are identical with those of the type of *C. Fenchelii*, which was kindly lent to me by Dr. Hans Schinz. According to a label with the type specimens, Berger appears to have mistaken this plant for *M. crystallinum* var. *grandiflorum*, Sond., but it is quite distinct from that species, and inhabits a totally different region.

In South African Gardening, 1928, p. 83, a plant from Great Namaqualand is mentioned under the name of *C. crassifolium*, L. Bol., but as there is no description it is impossible to understand what plant is meant, and according to international rules the name is invalid; probably the plant intended by that name is either *C. Fenchelii* or *C. grandifolium*.

8.-- *C. grandifolium*, N. E. Br. -- A stout herb, probably biennial.

153 Leaves in a large tuft or rosette, flat, broadly lanceolate, 4-5 inches long and 1-1½ inch broad, narrowed to a sessile or sub-petiolate base, obtuse, wavy, glabrous, papillate. Flowering branches arising from under the rosette of leaves, 4-8 inches long, 2-3 lines thick, two-edged, ascending, sometimes 1-flowered, but usually branching in a cymose manner and bearing 5-9 flowers, and having opposite leaves up to 1½ inch long, and small ovate, obtuse, opposite or sub-opposite bracts 3-4 lines long. Pedicels 4-9 lines long, stout. Calyx papillate, produced above its union with the ovary into a distinct tube about 1½-2 lines long; ovary part half-globose, 6-7 lines in diameter; lobes 3-4 lines long, 2-3 lines broad, ovate, obtuse, with or without a dorsal point. Petals very numerous, apparently 7-8 lines long, united into a distinct tube at the base. Stamens not very evident in the flower examined, but arising from the corolla-tube. Ovary apparently nearly superior, but too much crushed to admit of the determination of its stigmas or cells.

M. grandifolium, Schinz, in Bull. Herb. Boiss, Vol. V, p. 79 (1897).

Great Namaqualand: Near Rehoboth, Fleck 241A.

The above description is made from the type specimen kindly lent to me by Dr. Hans Schinz.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 84: 192. 1928.

(Continued from page 153.)

17.--CRYOPHYTUM, N. E. Br.

92 9.--*C. arenarium*, N. E. Br.-- An annual, 1-9 inches high, branching from the root. Branches alternate, apparently 2-edged on the younger parts, roughish, with pointed papillae. Leaves alternate on the branches, opposite at the very base, ½-1 inch long, 2½-5 lines broad, oblong or ovate, (dried), rounded at the apex, fleshy, labrous, apparently smooth, but perhaps minutely papillate when alive. Flowers solitary and opposite the leaves along the branches (not axillary), pedicellate. Pedicels 3-7 lines long and, together with the calyx, papillate like the branches. Calyx produced above its union with the ovary into a tube 1½-line long, unequally 5-lobed above; the two longer lobes leafy- 1½-3 lines long and 1 line broad, narrowly oblong, obtuse, the others shorter, broader and membranous. Petals (indried flowers) scarcely exceeding the calyx-lobes, 2½-3 lines long, 1/3-line broad, cuneately linear, rounded at the apex, yellow (ex. Pearson), probably united into a short tube at the base, but from dried material I have been unable to be sure of this. Stamens numerous, erect, nearly or quite as long as the petals, yellow. Stigmas 4-5, scarcely 1/2 line long, oblong, obtuse. Ovary more than half-superior, 4-5-celled; placentas axile. Capsule (closed), 2-2½ lines in diameter, with 4-5-valves and cells; valves 1 line long, whitish, their expanding-keels closely contiguous into one central keel, and their broad marginal wings erect or inflexed; cells open, no tubercles. Seeds several, but not very numerous in a cell, minute, smooth, white.

Erect Namaqualand: Klein Keras Mountains, Dinter 3,177 (type

192 specimen) between Makeis and Klein Karasberg, Pearson 8, 215
Ganas, Schinz 920, Orange River, Steingrover 113.

19.-- *C. sessiliflorum*, N. E. Br.-- Annual, coarsely papil-
late. Branches prostrate, divaricate. Leaves opposite, 11-12
inch long, 3-6 lines broad, lanceolate, narrowed below into a pet-
iole, subacute or obtuse. Flowers solitary, perhaps at first termin-
al, but by the development of a branch become axillary, or in forks
of the stems, on pedicels up to 6-7 lines long. Calyx unequally
5-lobed; lobes 3-6 lines long and 2-3 lines broad, subspathulate
or leaf-like, two of them longer than the other, spreading much be-
yond the petals. Corolla 6-8 lines in diameter; petals in about 1
series, acute, light yellow. Stamens about 20, in one series, lax,
erectly spreading, with their filaments dilated at the base in a
subglobose or disk-like manner, yellow. Stigmas 5. Ovary evidently
nearly superior, depressed. Fruit about 5 lines in diameter, acu-
tely 5-angled or ridged on the top, purple.

Mesemb. sessiliflorum, Ait. Hort. Kew. ed. 1, Vol. II, p. 193
(1789); Haw. Obs. 116, Misc. Nat. 46, Synop. 247 and Rev. p. 158,
Sond. in Fl. Cap., p. 454; Berger, Les. und Fort., 37; Britton in
Journ. Bot., 1917, p. 69; N. E. Br. in Journ. Linn. Soc., Vol. XLV,
p. 134.

South Africa: Locality unknown: introduced into cultivation
by Masson in 1774.

The above description is compiled from a drawing of the plant
by Simon Taylor, made probably about 1777 or 1778, and preserved
in the British Museum Herbarium; see Journal of Botany, as above
quoted.

All that has hitherto been known of this plant is that Aiton
placed it among those having yellow flowers and described it as
follows:-- "Leaves flat, spathulate and together with the stems
papulose; branches divericate; flowers sessile. Flowers July and
August. Native of the Cape of Good Hope. Mr. Fr. Masson. Intro-
duced 1774."

With the exception that the drawing does not represent the flo-
wers as sessile, it agrees with Aiton's description. But viewed from
above as they nestle among the leaves they might appear to be ses-
sile, and there can be little doubt that the drawing is correctly
named. Haworth states that he never saw this species, so that
it probably died out of cultivation.

The dilated, subglobose base of the filaments of the stamens
is a very remarkable character, and I refer this plant to *Cryophy-
tum* with some doubt, but until rediscovered, nothing more can be
done with it.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 84: 211. 1928.

(Continued from page 192.)

17.--*CRYOPHYTUM*, N. E. Br.

D.--FLOWERS RED.

211 11.-- *C. Barklyi*, N. E. Br. ex L. Bol. in S. Afr. Gard.,
1928, p. 83 and 84, f. 35. = *C. Barklyi*, N. E. Br. in Hook Ic. Fl.
Vol. XIX, t. 1820; Berger, Les. und. Fort., 45. *C. Barklyi*, var.

211 obtusifolium, L. Bol. in Ann. Bot. Herb., Vol. IV, p. 79.

Little Namaqualand. Hondelip Bay, Barkly and Pillans.

This plant has the stoutest stems and largest leaves of all the known species in any genus of this order of plants. The square stems attain to an inch in thickness, and the leaves up to as much as 15 inches long and 6 inches broad, and are very thick. Sir Henry Barkly, who discovered this fine species, informed me that the inhabitants of the region where it grows squeezed the water out of its leaves and used it for washing and drinking purposes in times of drought.

II.--Leaves narrowly spatulate or linear-spatulate; flowers rosy or colour unknown.

12.--*C. inachabense*, N. E. Br. = *M. inachabense*, Engl. Bot. Jahrb., Vol. XLIII, p. 192 and 194, f. 5.

Great Namaqualand: Sand-dunes at Inachab, Dinter 952.

13.-- *C. paulum*, N. E. Br.-- Plant in flower less than an inch high, with a few perfectly prostrate stems 1-4 inches long and up to 1 line thick, radiating from a central root, which is not more than 1 line thick, and apparently not descending more than 2-3 inches into the ground. The stems are terete, with internodes $1\frac{1}{2}$ -6 lines long, minutely papulose, green or purplish, bearing several very short axillary leafy branchlets 3-6 lines long scattered along them. Leaves opposite or some on the flowering part alternate, small, those on the main stems 5-9 lines long, $1-2\frac{1}{2}$ lines broad and $\frac{1}{2}$ -1 line thick near the apex, those on the branchlets smaller and crowded, flattish, usually spatulate, obovate to elliptic-oblong, shortly petiolate, sub-acute or obtuse, faintly channeled down the face, slightly or indistinctly keeled on the back, minutely papulose, green, tinted with red. Flowers in lax, terminal, few-flowered irregular cymes, or on weak plant solitary and terminal. Pedicels about 1 line long. Calyx unequally 5-lobed nearly down to its union with the ovary, papulose with much larger papulae than those on the stem and leaves; ovary-part hemispherical, sub-globose in every young fruit, $2\frac{1}{2}$ lines in diameter; lobes 3-4 lines long, the outer about 1 line broad and linear-oblong, the inner $2-2\frac{1}{2}$ lines broad, elliptic or elliptic-oblong, and with broad, membranous margins, all obtuse. Corolla apparently not more than 4-5 lines in diameter; petals numerous, in 3-4 series, united below into a tube about $1\frac{1}{2}$ line long with the free part about 2 lines long and $\frac{1}{2}$ line broad, linear, obtuse, white, or very pale pink at the apical part. Stamens arising from the corolla-tube in about 4 super-posed series, the upper at the mouth of the tube. Stigmas 4-5, erect, $2\frac{1}{2}$ lines long, filiform, apparently pale yellow. Ovary partly superior, 4-5-celled, with the conical upper part slightly 4-5-angled and minutely papulose, the papulae being a very striking character on the young purplish-tinted fruit; placentas axile. Capsule when closed sub-globose, $\frac{1}{2}$ lines in diameter, with very prominent sutures and 4-5 valves and cells; when expanded about 5 lines in diameter; pallid within, structure as for the genus. Seeds $\frac{1}{2}$ line in diameter, compressed, circular in outline, tuberculate, dark grey or fuscous when dry, blackish when wetted.

Riversdale Division: In grassy meadows near the Vet River, Muir 4145.

14.-- *C. Rogersii*, L. Bol. in S. Afr. Gard., 1928, p. 84.

Oudtshoorn Division: In a dry valley at Cango, 1,900 feet above sea-level. Bolus 11907. Zebra Siding: Rogers in Herb. Bolus 17177.

The flowers of this species are rosy according to a note on the label of Bolus 11907.

III.-- Leaves sub-terete or probably flattened or concave on the face; flowers white.

15.--*C. nodiflorum*, L. Bol. in S. Afr. Gard., 1927, pp. 326 and 327, and 1928, p. 84, t. 34. *M. nodiflorum*, Linn., Spl Fl. ed. 1, p. 480. Haw., Obs., p. 118, Misc. Nat., p. 54, Synop., p. 250, and Rev. 166; DC., Fl. Grass., t. 88; Sibth. and Sm., Fl. Graeca., t. 480; Cusin et Ansberque, Herb. Fl. France, Vol. IX, t. 50; Fiori et Paol., Ic. Fl. Ital., p. 122; Reichenb., Fl. Germ., Vol. XXIV, t. 156; Coste, Fl. France, Vol. II, p. 122; S. Afr. Gard., 1927, p. 281, f. 9E; Berger, Mes und Port., p. 41.

Not common in South Europe, North Africa, Arabia, Persia, Baluchistan, Kurdistan, Madeira and the Canaries, here it is probably a native, and as it seems scarce in South Africa (from whence I have seen specimens from Little Namaqualand, at Walle Areal, Millans 17906; Van Rhynsdorp Division; Eenkokerboom, Schlechter 11068; and Cape Peninsula, Wolley Dod 2106, 3666) it has probably been introduced there, as it has been also into California. According to Aiton it was in cultivation in 1739.

16.--*C. neglectum*, N. E. Br.-- Plant apparently about 4-6 inches high, glabrous, papulose. Branches erect, terete, 1-1½ lines thick. Leaves alternate, ascending, incurved, 4-9 lines long and 1 line thick (dried), sub-terete or probably slightly flattened or channelled down the face, obtuse. Cymes terminal, 1½-2½ inches in diameter, 3-9 flowered, bracteate. Pedicels 1-2 lines long. Calyx unequally 5-lobed; ovary part hemispherical, 4-4½ lines in diameter; the longer lobes 3-4 lines long, with leaf-like tips. Corolla probably 10-12 lines in diameter; petals of the dried flower about 4-4½ lines in diameter; petals of the dried flower about 4-4½ lines long and 1-line broad, apparently white.

Worcester Division: Near Worcester, Cooper 1660, 1745.

17.--*C. Maxwellii*, L. Bol. in S. Afr. Gard., 1928, p. 84, name only,. It may be a synonym of one of the above species.

18.-- *C. Wilmaniae*, L. Bol. in S. Afr. Gard. 1928, p. 84, f. 33.

South Africa: "Without precise locality, but probably from De Aar" ex. L. Bolus.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 84: 253. 1928.

(Continued from page 212.)

Owing to the unscrupulous manner in which the usual courtesy and code of honour maintained among scientific workers has been discarded, and the way results of my own investigations are being persistently published elsewhere, in spite of protest, for the purpose of claiming priority of authorship for name combinations that must

253 be known to be in my own MSS. and awaiting publication, I here interrupt my monographic account to publish some of the name-combinations that are still left to me. A fuller account, with synonymy and descriptions, will follow later.

CONICOSIA, N. E. Br.

C. affinis, N. E. Br. (*M. elongatum*, Salm Dyck, not of Haworth); *C. brevicaulis*, N. E. Br. (*M. brevicaule*, Haw.); *C. capensis*, N. E. Br. (*M. pugioniforme*, Haw., not of Linne); *C. elongata*, N. E. Br. (*M. elongatum*, Haw.); *C. fusiformis*, N. E. Br. (*M. fusiforme*, Haw.); *C. Muirii*, N. E. Br. (Root fleshy, longated, leaves trigonous, Muir 4128, will be fully described later); *C. pugioniformis*, N. E. Br. (*M. pugioniforme*, Linn., *M. capitatum*, Haw.); *C. Roodiae*, N. E. Br. (root fleshy, elongated; capsule $1\frac{1}{2}$ - $1\frac{1}{4}$ inch in diameter); *C. robusta*, N. E. Br. (*M. pugioniforme*, L. Bol., not of Linn. Leaves on the flowering branches 6-8 inches long and 3- $3\frac{1}{2}$ lines broad when dried.)

HYMENOGYNE, N. E. Br.

H. glabra, Haw.; *H. Stephensiae*, N. E. Br. (*M. pomeridianum*, L. Bol. partly).

OPOPHYTUM, N. E. Br.

O. aquosum, N. E. Br. (*M. aquosum*, L. Bol.); *O. dactylinum*, N. E. Br. (*M. dactylinum*, Welw.); *O. fastigiatum*, N. E. Br. (*M. fastigiatum*, Thunb.); *O. Forskahlia*, N. E. Br. (*M. Forskahlia*, Hochst.); *O. speciosum*, N. E. Br. (described without a name in Ann. S. Afr. Mus., IX, 151, and will be described fully later).

PHYLLOBUS, N. E. Br.

P. Lesliei, N. E. Br.; will be described later, but differs from *P. resurgens* by its longer pedicels and larger flowers; *P. rubicalyx*, N. E. Br., calyx pubescent; *P. resurgens*, N. E. Br. (*M. resurgens*, Kensit. *Aridiaria resurgens*, L. Bol.).

PSILOCAULON, N. E. Br.

P. absimile, N. E. Br.: *P. acutisepalum*, N. E. Br. (*M. acutisepalum*, Berger); *P. album*, L. Bol.; *P. arenosum*, L. Bol. (*M. arenosum*, Schinz, and *M. gymnocladum*, Schlecht, and Diels); *P. articulatum*, N. E. Br. (*M. articulatum*, Thunb., and *M. secundum*, Thunb.);
254 *P. asperulum*, N. E. Br. (erect; branches covered with minute blunt points, not granules, Van der Bijl 31); *P. Bijliae*, N. E. Br. (erect; branches $1\frac{1}{2}$ - $2\frac{1}{2}$ lines thick, microscopically granulate, Van der Bijl 30); *P. caducum*, N. E. Br. (*M. caducum*, Ait., not of L. Bol.); *P. clavulatum*, N. E. Br. (*M. clavulatum*, Berger.); *P. corallinum*, N. E. Br. (*M. corallinum* Thunb.); *P. coriarium*, N. E. Br. (*M. coriarium*, Burch.);
P. densum, N. E. Br. (flowers in dense leafy masses, Schlechter 1); *P. dimorphum*, N. E. Br. (*M. dimorphum*, Welw.); *P. Dinteri*, N. E. Br. (*M. dinteri*, Engl.); *P. diversipapillosum*, N. E. Br. (*M. diversipapillosum*, Berger); *P. fasciculatum*, N. E. Br. (branchlets bunches together in clusters on the main branches; petals

254 magenta-pink); *P. fimbriatum*, L. Bol.; *P. Gessertianum*, N. E. Br. (*M. Gessertianum*, Dint. and Berg.); *P. glareosum*, N. E. Br. (*M. glareosum*, Berger.); *P. granulicaule*, N. E. Br. (*M. granulicaule*, Haw.); *P. junceum*, N. E. Br. (*M. junceum*, Haw., not of L. Bol.); *P. leptarthron*, N. E. Br. (*M. leptarthron*, Berger.); *P. Levynsiae*, N. E. Br. (shrub 18 inches high, smooth and glabrous; leaves subtrigonal; flowers pink); *P. luteum*, L. Bol.; *P. melanospermum*, N. E. Br. (*M. melanospermum*, Berger.); *P. mentiense*, N. E. Br. (*M. mentiense*, Berger.); *P. mucronulatum*, N. E. Br. (*M. mucronulatum*, Dint.); *P. namaquense*, N. E. Br. (*M. simile* var. *namaquense*, Sond.); *P. Pageae*, L. Bol.; *P. parviflorum*, L. Bol. (*M. parviflorum*, Jacq., not of Haw., *M. micranthum*, Haw, *P. micranthum*, L. Bol.); *P. Pfeilii*, N. E. Br. (*M. Pfeilii*, Engl.); *P. pubescens*, N. E. Br. (stems erect or becoming decumbent, stout, much branched, pubescent. Flowers pink. Muir, 3987. *P. salicornioides*, N. E. Br. (*M. salicornioides*, Pax.); *P. Schlichtianum*, N. E. Br. (*M. Schlichtianum*, Sond. and *M. Luntzei*, Schinz.); *P. simile*, N. E. Br. (*M. simile*, Sond.); *P. squamifolium*, N. E. Br. (*M. junceum*, L. Bol. partly and *M. clavellatum*, Berger, partly, as to Pearson 3273. Leaves reduced to scales. Flowers red); *P. subnodosum*, N. E. Br. (*M. subnodosum*, Berger.); *P. tenue*, N. E. Br. (*M. tenue*, Haw. and *M. bicornis*, Sond.); *P. Trothai*, N. E. Br. (*M. Trothai*, Engl.).

SYNAPTOPHYLLUM, N. E. Br.

S. Juttæ, N. E. Br. (*M. Juttæ*, Dint. and Berg.); *S. Sladenianum*, N. E. Br. (*M. Sladenianum*, L. Bol.).
N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 84: 268. 1928.
(Continued from page 254.)

18.--PRENIA, N. E. Br.

268 Succulent perennials, papillate, either with short branching main stems bearing tufts of crowded leaves at their ends, from which decumbent flowering branches arise, or with long, prostrate stems having distinct internodes. Leaves opposite, sessile, several times longer than broad, linear-lanceolate, flat or channelled above and keeled or rounded on the back. Flowers in terminal, lax, few-flowered cymes or occasionally solitary. Calyx produced above its union with the ovary into a short tube, 4-5-lobed above. Petals numerous, in 2-3 series, united at the base into a short tube, arising just above the union of the calyx with the ovary. Stamens numerous, arising from the tube of the corolla, erect; staminodes none. Stigmas 5, filiform and as long as the stamens. Ovary partly superior, 5-celled; placentas axile. Capsule (where known) obconic, half-superior, with 5 valves and cells; each valve with the expanding-keels closely contiguous, forming one acute central keel, and with large marginal, wing-like, sub-membranous flaps standing erect or infolded towards the keel; cells open, without cell-wings or tubercles. Seeds compressed, somewhat D-shaped in outline, minutely tuberculate.-- N. E. Br. in The Gardeners' Chronicle, 1925, Vol.

Species 2, natives of South Africa; the type of the genus being *P. pallens*, N. E. Br.

The name is derived from the Greek, *prenes*, prone or bent forwards, in allusion to the decumbent flowering branches.

As the two species comprising this genus are well figured and described, and as I have no living material of them, I merely distinguish them by the colour of their flowers and give references to their places of publication.

1. *P. pallens*, N. E. Br.--Petals white or pale yellowish white. *P. pallens*, Ait. Hort. Kew, Ed. 1, Vol. II, p. 132; Haw. Obs. 197, Misc. Nat., p. 52, Synon. p. 250, and Rev. p. 168; Salm Dyck, Mes. 863, f. 2; Berger, Mes. und Port., pp. 45 and 46, f. 6, not of Jacquin. *M. lanceum*, Thunb., Prodr., p. 89, and Fl. Cap., ed. Schultes, p. 417; Sond. in Fl. Cap., Vol. II, p. 435; Haw. Misc. Nat. p. 54, and Rev., p. 170; N. E. Br. in Bothalia, Vol. 1, p. 157. *M. loratum*, Haw. Rev. p. 168. *M. expansum*, Dl., Pl. Grass, t. 47, not of Linne. *Platythyra pallens*, L. Bol. in S. Afr. Gard. 1. pp. 326 and 327, f. 11, F.

Cape Division: Near Kaitland, Wolley Dod, 2131, Papendorp, Farpe, and Clanwilliam Division, Leipoldt 353. Introduced into cultivation by Masson in 1774.

Sonder, in the Flora Capensis above quoted, refers specimens from Zwartkops River, Botshasberg, Fish River and Kat Berg to this species, but I believe that they are wrongly named, and that possibly they may belong to *P. relaxata*.

On what ground Mrs. Bolus refers this plant to the very different genus *Platythyra* is unexplained.

2. *P. relaxata*, N. E. Br. - Petals bright carmine-magenta. *M. relaxatum*, Willd., Enum. Pl. Hort. Berol., Suppl. p. 36; Haw. Suppl. p. 93, and Rev. 169; Salm Dyck, Mes. 65, f. 1; Berger Mes. und Port., p. 45.

South Africa: Locality unknown, only known to me from cultivated specimens.

19.--HYDRODEA, N. E. Br.

Annuals, extremely succulent and watery, minutely pubulose. Stems and branches prostrate, with distinct internodes, very stout. Leaves opposite at the base, alternate or occasionally opposite on the stems, sessile, stout, cylindric or oblong, obtuse. Flowers sessile, alternate. Calyx produced above its union with the ovary into a short tube, subequally or unequally 5-lobed above. Corolla small, not exceeding the calyx-lobes, arising from around the top of the ovary; petals united at the basal part into a tube. Stamens numerous, arising from the corolla tube, erect; filaments not bearded. Stigmas 5, erect, slenderly subulate, flattish; no style. Ovary half-superior (not inferior as figured), 5-celled; placentas axile. Capsule half or more than half-superior, really 5-valved, but as each valve separates into two segments it falsely appears to be 10-valved; the valves separate and stand erect, because the expanding-keels, instead of being hygroscopic so as to cause the valves to spread out flat, are converted into stiff, thin plates of parchment-like texture, that are contiguous at the lower part but separate above, and have inflexed acute points, and the valves have

268 membranous marginal wings, infolded and united in pairs between the valves and connecting them together. Seeds very small, ovoid, smooth.-- N. E. Br. in The Gardeners' Chronicle, 1925, Vol. LXXXVIII, p. 412.

Species 2, natives of the Island of St. Helena and Great Mamacualand. *H. cryptantha*, N.E.Br., is the type of the genus.

The name is derived from the Greek, *hydros*, watery, because the St. Helena plant is stated to be "so very succulent that it will not support its own weight when held up from the ground, and water is seen to drop from it when simply carried in the hand without any pressure," according to Mellis, St. Helena, p. 241.

1. *H. cryptantha*, N.E.Br.-- Annual; branches prostrate, 4-6 lines thick, terete, very succulent, glabrous, papillate, bright green, changing to yellow as it gets old. Leaves alternate or occasionally opposite, 1-2 inches long, 3-6 lines thick, somewhat fusiform-cylindric, obtuse. Flowers arranged in an irregularly cymose manner. Pedicels about 6 lines long, stout and stem-like, and together with the calyx-tube swelling in fruit to an ovoid form upto 9 lines in diameter. Calyx-tube continuous with the pedicel, and above its union with the ovary about 2 lines long; lobes at first (according to the figures) 1 1/4-4 lines long, becoming much enlarged in fruit, terete, obtuse. Corolla 3-4 lines in diameter (according to the figures); petals apparently about 3-4 1/2 lines long, united below into a distinct tube about 2 lines long, white. Stamens 1-1 1/4 line long (only 2 seen), filaments filiform, white, anthers apparently yellow. Stigmas not seen, all destroyed by insects. Ovary nearly superior, conically ovoid. Fruit about 7-8 lines in diameter on the living plant according to the figure, the actual dried capsule being 4 lines in diameter. Seeds 1/3 -line long, oboid, brown.--

H. cryptanthum, Hook. f., Icon. Pl. t., Vol. II, p. 25, t. 1034 (1868); Mellis, St. Helena, p. 241, t. 26, excluding the dissections from both plates. Berger, Mes. und Port. p. 42.

Island of St. Helena: On a plain at Prosperous Bay, Burchell 115. "It grows on the hottest parts, in the most barren, arid, rocky soil near the sea, in the neighbourhood of Sandy Bay beach and Turk's Cap Bay, and is to be met with generally on the southern and eastern outskirts of the island." (Mellis)

Of this very remarkable plant only a single specimen (which was collected by Burchell) exists in the New Herbarium. From this specimen the artist (W. Fitch) made the dissections which appear upon the plates quoted, the originals of the drawings being made upon the sheet containing the specimen. I have carefully examined the dissected flowers from which Fitch made those analyses, and also two flowers upon the specimen without damaging flowers upon the specimen without damaging them, and find to my surprise that all his drawings of the flower-structure are absolutely wrong. For the sepals are not free to the base nor gibbose on the back as represented; the petals are not free to the base; the stamens do not arise from the top of the ovary around the thickened base of a style; there appears to be no style at all, so far as I can discover, but the stigmas, free parts of the petals and the stamens seem to have been eaten by mites in the flowers examined; the ovary is not inferior and is only 5-celled, not 3-celled, as represented in the dissections. I believe that Mr. Fitch's drawings were partly concocted from the descriptions given in books of the structure of the genus *Mesembryanthemum*. They certainly do not represent the floral struc-

This genus differs from all others not only in its vegetative character, but also by the valves of the capsule being distinctly bifid, and the thin, stiff keels on the valves are not hygrometric, a character that also occurs in *Conicosia*.

2. *H. Hampdenii*, N. E. Br. In Journ. of Bot., 1928, p. 106, Annual, with stout cylindric "stems creeping along the ground and covering a good deal of space." Basal leaves opposite, united at the base, apparently oblong, obtuse, flattish, but very thick and pulpy; those on the flowering stems alternate, the lower being apparently more or less cylindric or clavate or ellipsoid, as thick as broad, very obtuse, papulose and very pulpy or watery, becoming smaller, less pulpy, and bract-like towards the ends of the branches glabrous, green. Flowers sessile, alternate along the branches. Calyx Pear-shaped or obovoid, papulose, pulpy-glabrous, green, produced above its union with the ovary into a tube $1\frac{1}{2}$ line long subequally 5-lobed above; lobes erect, 2-3 lines long and as much in breadth, orbicular, rounded at the apex, some with thin or membranous margins. Corolla small and apparently about 4-5 lines in diameter; petals numerous, not or scarcely exceeding the calyx-lobes, about 5 lines long, filiform-linear, acute, united below into a tube $3\frac{1}{2}$ -4 lines long, white. Stamens numerous, arising from the corolla-tube, 2-2 $\frac{1}{2}$ lines long; filaments not bearded, white; anthers yellow. Stigma 5, erect, 2 $\frac{1}{2}$ -3 lines long, exceeding the stamens, flattish-subulate, acute, pallid. Ovary half-superior, dome-shaped and minutely papulose on the top, pale green 5-celled, with axile placentas. Fruit not seen.

Great Namaqualand: Near Luderitz, Hampden.

Described from living material sent to the British Museum by the Rev. Hobart Hampden in February, 1928.

Although it is plant has neither beauty nor grace to recommend it to notice, yet it is of very great interest to those who study the distribution of animals and plants, because it affords another link in the slight chain of evidence that exists showing some connection between the mid-ocean island of St. Helena and South Africa, for the only other known species of *Hydrodea* is a native of St. Helena. Other examples of this peculiar distribution are found in the genera *Felargonium*, *Phyllis* and *Tripteris*, of which there is one species of each in St. Helene the remainder being mostly South African.

N. E. Brown
(To be continued.)

302 *Mesembryanthemum*.-- Mr. N. E. Brown asks us to state that "Phyllobus" (p. 253) should read *Phyllobolus*.

MESEMBRYANTHEMUM.

Gard. Chron. III. 84: 313. 1928.

(Continued from page 268.)

20.--PLATYTHYRA, N. E. Br.

313 Perennial. Rootstock a cluster of long, fleshy roots, 3-4 lines long. Stems herbaceous, prostrate, triangular or quadrangular, with distinct internodes, glabrous. Leaves opposite,

313 petiolate, ovate or lanceolate, flat. Flowers solitary, axillary or in the forks of the branches pedicellate, bractless. Calyx produced above its union with the ovary into a short tube, very unequally 4-lobed above, two of the lobes being large and leaf-like. Petals very much shorter than the calyx-lobes, linear, united into a short tube at the base, arising at the middle of the produced calyx-tube. Stamens numerous, in many series, arising from the corolla-tube, erect. Stigmas 4, small, stout, obtuse; no style. Ovary partly superior, 4-celled; placentas axile. Capsule with 4 valves and cells; valves recurving when wetted, very broad, each with 2 thin and deep parallel (or sub-contiguous?) expanding-keels toothed all along their tops, and with an inflexed thin membranous flap or wing turned back from their tips and attached to the valve about midway between the keels and margin of the valve and forming a sort of pocket on the outer side of each keel; cells open, no cell-wings or tubercles. Seeds moderately shaped large for the group, reniformly D-shaped, minutely tuberculate.--N. E. Br., in The Gardeners' Chronicle, 1925, Vol. LXXVIII, p. 412.

Species 1, *P. Haeckeliana*, N. E. Br., a native of South Africa.

The name is derived from the Greek, *platys*, broad, and *thyris*, a door, in allusion to the broad valves of the capsule.

By its habit and petiolate leaves this genus bears some resemblance to *Aptenia cordifolium* and *Cryophytum Aitonis*. From the former, however, it differs by the calyx being produced into a shorter tube above the ovary end by the presence of infolded membranous flaps to the valves of the capsule. From the latter by all the leaves being opposite and the flowers seated in the forks of the branches.

1. *P. Haeckeliana*, N. E. Br.-- Plant forming a flat carpet 3-5 feet in diameter of prostrate herbaceous branching stems. Leaves all opposite, and, including the petiole, 1-2 inches long and 3-9 lines broad, lanceolate, subacute, cuneately narrowed into a petiole, not or scarcely united at the base, flat or slightly concave above and with a stout, rounded keel or midrib on the back, glabrous. Flowers terminal in the forks of the branches or sometimes in leafy cymes. Pedicels 6-13 lines long. Calyx with the two larger lobes leaf-like, 6-11 lines long and 3-4 lines broad. Petals apparently about 4-5 lines long, with their united part about 1 line long, pale yellow. Stigmas scarcely 1 line long, stout. Capsule about 3 lines in diameter when closed. Seeds about 4-line in diameter, compressed, minutely tuberculate, brown. Otherwise as for the genus.

P. Haeckelianum, Berger in Engle Bot. Jahrb., Vol. XLV, p. 324 (1910). N.E.Br. in Bothalia, Vol. I, p. 160. *P. ovatum*, Thunb., Fl. Cap., ed. Schultes, p. 417 (1823), but not of his earlier works, see Bothalia at place above quoted. *P. elongatum*, Eckl. and Zeyh., Enum. Fl. Afr. Austr., p. 321 (1836), not of Haworth. *P. angulatum*, Eckl. and Zeyh., var. *ovatum*, Sond. in Fl. Cap., Vol. II, p. 454.

Uitenhage Division: Valley and hills of Swartkops River, Zeyher 2,624. Near Uitenhage, Muir 3946. Thunberg.

21.--APTENIA, N. E. Br.

A succulent herb, perennial, but of short duration; branches elongated, with distinct internodes, prostrate. Leaves opposite,

313 petiolate, flat. Flowers solitary in the forkings of the branches, pedicellate. Calyx unequally 4-lobed down to its union with the ovary. Petals numerous, united at the base into a short tube. Stamens many, but not very numerous, erect, arising from the corolla-tube; filaments not bearded. Stigmas 4, minute; no style. Ovary inferior, 4-celled; placentas axile. Capsule with 4 valves and cells; valves broader than long, the apical part so abruptly thickening that the basal termination of the thickening is quite vertical; expanding keels closely contiguous, forming one central keel with its end united to the sub-vertical base of the thickened apical part of the valve, no marginal wings or flaps to the valves; cells open, without cell-wings or tubercles. Seeds compressed, circular in outline, tuberculate. N. E. Br. in The Gardeners' Chronicle, 1925, Vol. LXXVI I, p. 412, and in Journ. of Bot., 1928, p. 139. Litocarpus, L. Bol., in Fl. Pl. of S. Afr., Vol. VII, t. 261, f. 11.

Species 1, *A. cordifolia*, N. E. Br. (Mesemb. cordifolium, L.). A native of South Africa, but naturalised in many of the warmer parts of the world.

The name is derived from the Greek, apten, wingless, in allusion to the absence of wings of the valves of the capsule.

1. *A. cordifolia*, N. E. Br. in Journ. of Bot., 1928, p. 139. -- A prostrate, glabrous herb, minutely papulose on all green parts. Leaves 1-2½ inches long, including petiole, 2-15 lines broad, cordate-ovate, acute. Pedicels about 6 line long. Calyx with two of the lobes large and leaf-like, 5-10 lines long, 3½-7 lines broad, ovate or elliptic, acute or subacute, the other two about 4 lines long or less and subulate. Corolla 6-8 lines in diameter; petals cuneately linear, obtuse, bright magenta-purple or rosy-purple, the inner passing into staminodes. Stamens with white filaments and bearded anthers. Stigmas about 1-line long, oblong, obtuse. Capsule with valves about 2 lines long and 3½ lines broad, broadly deltoid-ovate, uniformly pallid or cream-coloured. Seeds uniformly pallid or cream-coloured. Seeds about 2/3-line in diameter, compressed, sub-circular, tuberculate all over, blackish-brown.

M. cordifolium, Linn. f. Suppl., p. 250; Haw., Obs. p. 192-195, Misc. Nat. p. 50, Synop. p. 248, and Rev., p. 159; Jacq., Ic. Rar., Vol. III, p. 6, t. 487; Smith, Spicil. Bot., t. 6., DC., Fl. Grass. t. 102; Salzm. & Nyck, Mes., 61, f. 1; Ann. Sc. Nat. Paris, ser. 3, Vol. XVIII, p. 240, t. 10, f. 17-24; Junghans, Ic. Pl. t. 37; Meigen, Deutschl. Fl., Vol. II, t. 96; Payer, Organog. Comp. Fl., p. 356, t. 80, f. 17-24; Flor. Mag., 1869, t. 460; Gartenfl., 1877, p. 153; Sauviage, Cult. Littor. Mediterr., n. 86, with fig.; Rev. Hort. 1903, p. 525, fig.; Berger, Mes. und Port., p. 53 and 54, f. 8, III-IV; Schoenland in Tr. Phil. Soc. S. Afr., Vol. IX, p. 36, t. 2, f. E.; Journ. Bot. Soc. S. Afr., 1927, t. 4, f. 4, C.; L. Bol. in Mesemb. 13, f. 3, D.; Litocarpus cordifolius, L. Bol. in Fl. Pl. S. Afr., Vol. VII, under t. 261, fl 11.

A native of the eastern coastal districts of South Africa, whence it was introduced into cultivation by Lesson in 1774, and has now become naturalised in several of the warm parts of the world.

N. E. Brown
(To be continued.)

22.---DINTERANTHUS, Schwant.

472

Stemless perennials. Each growth with one pair (or when making new growth, two pairs) or very thick and fleshy leaves, which are united at the base for one-third to two-thirds of their length and are convex on the face, causing them to be united higher up at the middle part than at the edges, distinctly dotted, and with a very minutely granulated surface. Flower solitary, terminal, appearing sessile, the flat and acutely two-edged pedicel, which is visible in the fruit, being entirely concealed between the united part of the leaves. Calyx subequally 6-8-lobed; some of the lobes having membranous edges. Petals numerous, free, spreading horizontally. Stamens numerous, erect, exposed to view from their base; filaments bearded at the base. Stigmas 6-9, subulate, diverging. Ovary inferior, flattish at the top, 6-9-celled; placentas on the outer wall of the cells. Capsule shortly and broadly obconic, flattish with slightly raised sutures on the top, with 6-9 valves and cells; valves widely spreading or recurved when expanded; expanding-keels closely contiguous into a central keel, with broad membranous margins; cell open, without cell-wings and without a placental tubercle. Seeds very numerous in a cell, very minute.-- Schwantes in Zeitschr. f. Sukkulantenkunde, 1926, p. 184, and in Mollers Deutsche Gartner Zeitung, 1927, p. 223.

Species 3 (one may not belong) native of Great and Little Namaqualand, the type of the genus being *D. microspermus*, Schwant.

The name is given in honour of Professor K. Dinter, the suffix being derived from the Greek anthos, a flower.

When this genus was originally published, no character was mentioned by which it could be distinguished from *Rimaria*, and as I had not seen any specimen of the type of the genus, and only a seedling of one of the other plants placed with it, I referred *D. microspermus* to *Rimaria*. But now that I have obtained adult living plants with ripe fruits attached to them of both *D. microspermus* and *D. Margaretæ*, I find that they are quite distinct not only from *Rimaria*, but also generically from each other, as, indeed, Schwantes himself considers them to be (Mollers Deutsche Gartner Zeitung, 1927, 223-223), for he places *D. Margaretæ* in a subgenus which he calls *Lapidaria*, and quotes the plant as *Lapidaria Margaretæ*, Dint! and Schwant., but still gives no definite structural characters by which these genera can be distinguished from *Rimaria*. Upon comparison, however (including a difference in habit, which, taken alone, of course, is of no generic importance), I find the following distinctions, which I here put in tabulated form for comparison, and probably, when contrasted alive, the flowers will furnish further distinctive character.

1. Leaves dotted, their surface microscopically granulate; old plants with only one or (when making new growth) two pairs of leaves present on each growth at the same time; petals in about two series, widely spreading from their base, so that the basal part of the column of stamens is fully exposed to view; cells of the fruit open, without cell-wings, and the expanding-keels contiguous into a central keel; stigmas 6-9. *Dinteranthus*.

Leaves not dotted; petals in 3 or 4 series, ascending-spreading so as to form a sort of cup in which the basal part of the stamens is more or less concealed; cells of the fruit roofed with membranous cell-wings and the expanding-keels diverging, at least at the upper part; stigmas 6-11.

2.

2. Surface of leaves microscopically granulated; old plants with 3-4 pairs of leaves always present on each growth at the same time, and the leaves, when not at rest, more or less separated; flowers yellow. Lapidaria.

Surface of the leaves smooth, not microscopically granulated; old plants with only one or (when making new growth) two pairs of leaves present on each growth at the same time, and the leaves (when not in flower), more or less closed together; flowers white or pink. Rimaria.

The following are the species of *Dinteranthus* at present known.

1. *D. microspermus*, Schwant., in Zeitschr. f. Sukkulantenkunde, 1926, Vol. II, p. 194, and in Rollers Deutsche Gartner Zeitung, 1927, n. 223. *D. microspermum*, Dint. and Derenb. in Zeitschrift. f. Sukkulantenkunde, 1926, p. 264 and 276, with figs. and Dint. Sukk. in Sudwestafrika, II, n. 105, etc. *Rimaria microsperma*, N. E. Br. in The Gardeners' Chronicle, 1927, Vol. LXXI, p. 35, f. 46.

This plant was fully described under *Rimaria* at the place quoted.

Great Namaqualand, Dinter. Little Namaqualand, Maughan Brown 709.

2. *D. puberulus*, N. E. Br.-- Growths 9-18 lines high, with the two leaves united for one-third to one-half of their total length, the free parts diverging, 6-10 lines long, 6-8 lines broad and 4-6 lines thick, oblong, obtuse, slightly convex on the face, rounded on the back and bluntly keeled at the apex, microscopically granulated-puberulous, and velvety to the touch, greyish-green, dotted with darker green. Flowers not seen. Capsule, when closed, 14-5 lines in diameter, shortly when broadly obconic, flattish or slightly convex, with 6-7 raised sutures on the top, and with 6-7 valves and cells; when expanded, 8-8 lines in diameter; expanding-keels contiguous into a stout central keel, brown, with broad membranous marginal wings; cells open, without (or in the largest capsule seen with rudimentary) cell-wings. Seeds about 1/6-line long, pear-shaped or sub-globose with a point, smooth, brown.

Little Namaqualand, Maughan Brown 703.

3. *D. Fole-Evansii*, Schwant., in Rollers Deutsche Gartner Zeitung, 1927, p. 223. *Rimaria Fole-Evansii*, N. E. Br. in The Gardeners' Chronicle, 1926, Vol. LXXII, p. 156, f. 77. *D. Fole-Evansii* N. E. Br. in Journ. Linn. Soc., Vol. XLV, p. 90.

Preska Division: Precise locality unknown. McLeod.

I placed this doubtfully under *Rimaria*, as I had not then, and have not now, been able to examine flowers and fruits of it, nor does Schwantes appear to have done so.

Under this genus is also enumerated *D. inexpectatus*, Schwant.,

472 in Zeitschr. f. Sukk., 1926, p. 184, and 1927, p. 30, without a description or reference, but evidently founded upon *M. inexpectatum* Dint. in Dinter's Sukk. in Sudwestafrika, p. 106, which again is only mentioned by name, without any description, and therefore both names are invalid, and the plant intended may not belong to this genus.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 84: 492. 1928.
(Continued from page 472.)

LAPIDARIA, Schwant.

492 Stemless, perennial. Each adult growth with 3 or 4 pairs of crowded leaves always present at the same time, shortly united at the base, flat or slightly concave on the face, not dotted, with a minutely granulated surface. Flower solitary, terminal, pedicellate, but with the pedicel concealed in the bases of the leaves. Calyx somewhat compressed and 2-edged, sub-equally 7-lobed nearly down to its union with the ovary; lobes ovate, all but the two outer with membranous edges, dotted. Petals numerous, "loosely united at the base" ex Dinter, ascending-spreading so as to form a cup. Stamens numerous, erect, the inner much shorter and more inflexed than the outer, partly concealed in the cup of the corolla; filaments bearded at the base. Stigmas 6-7, subulate or filiform, ascending, with recurved tips, as long as or exceeding the stamens. Ovary inferior, flattish at the top, 6-7-celled; placentas on the outer wall of the cells. Capsule shortly and broadly obconic, flat, with raised sutures, at the top, with 6-7 valves and cells; valves at the widely spreading or recurved when expanded; expanding-keels contiguous below, diverging at the apical part, with broad membranous margins; cells roofed with membranous cell-wings, without a tubercle at the opening. Seeds.

A monotypic genus, native of Namaqualand.

The name is doubtless derived from the Latin, *Lapidarius*, stony probably in allusion to the stony ground in which it grows.

1. *L. Margaretae*, Schwant., in Mollers Deutsche Gartner Zeitung, 1927, p. 223. Old plants about 1 $\frac{1}{2}$ -1 $\frac{1}{2}$ inch high, formed of a clump of densely crowded growths, each with four pairs of thick, fleshy leaves present at the same time; leaves 6-9 lines long, 7-12 lines broad, 7-7 lines thick, oblong in young plants, broadly ovate in old plants, obtusely pointed, flat or slightly concave above with sharp edges, and keeled at the apex, of hard or firm substance, glabrous, with a smooth microscopically granulated surface, of a peculiar rusty-ochreous colour in imported plants, but in cultivated plants whitish, with a rosy tint or in sunless years becoming greenish, with yellowish or ochreous edges and keel. Flowers terminal, appearing sessile, but with a pedicel concealed between the basal part of the leaves. Calyx sub-equally 7-lobed, ruberulous; lobes about three lines long, 1 $\frac{1}{2}$ -2 line broad, oblong or ovate-oblong, obtuse, three with membranous margins. Corolla 1-2 inches in diameter; petals numerous in 3-4 series, the outer 6-9 lines long, 1 $\frac{1}{2}$ -2 line broad, the inner gradually smaller, cuneately linear, obtuse or sub-acute, yellow. Stigmas 6-7, about 3-4 $\frac{1}{2}$ lines long, filiform, acute, greenish-yellow. Capsule as for

492 the genus. Seeds scarcely 4-line long, pale brown.

M. Margaretae, Schwant., in *Monatsschr. f. Lakteenk.*, 1919, pp. 55 and 56, with figure, and 1921, p. 170, f. 1-3. *Argyroderma Margaretae*, (by error *Maragartiae*) N.E.Br. in *The Gardeners' Chronicle*, 1926, Vol. LXXIX, p. 268 and 269, f. 135. *Anteranthus Margaretae*, Schwant., in *Hollers Deutsche Gartner Zeitung*, 1927, pp. 150-151, with fig.; L. Bol. in *Journ. Bot. Soc. S. Af.*, 1927, t. 2, f. 4, and *Mes.*, p. 41, t. 15.

Great Namaqualand: Near Warmbad, growing among quartzite stones, Dinter, 5, 174. Bushmanland: Towards Pella. Pole Evans.

The adult, native-grown, living plants of this species, for which I have to thank Dr. I. B. Pole Evans, are very different in appearance from the young plants I have hitherto seen, and which were raised in Europe. These old plants have their leaves much shriveled, on account of the great drought to which they have been subjected during the past few years, but even when in proper growth after a supply of rain, it is evident that they would be very crowded. For want of knowledge of its flowers and fruit, I had wrongly referred this plant to *Argyroderma*, because, having to place it somewhere, the vegetative characters appeared best to accord with that genus, and the flowers had not then been described.

GIBBAEUM, Haw.

G. Marlothii, N. E. Br.-- Growths, when at rest, obliquely ovoid, something like those of *G. gibbosum* in form, but smaller, and the leaves less unequal, 12-15 lines long, composed of two unequal or sub-equal leaves united for 3-4 lines at the base; when the leaves are unequal, the free part of the larger leaf is 7-10 lines long, trigonous-ovoid, slightly compressed and bluntly keeled at the apical part, obtuse; the smaller leaf being 1-2 lines shorter in the specimen seen, and under cultivation the leaves are mostly sub-equal; when at rest the leaves are pressed together, when in active growth they are ascending-spreadin; surface smooth, glabrous, green, or under natural conditions "yellow and brown," according to Marloth. Pedicels compressed and more or less 2-edged, glabrous. Calyz 6-lobed, glabrous; lobes about 2 lines long, ovate, two of them slightly keeled. Corolla 9-12 lines in diameter, expanding in sunshine, petals in one series, 4-5 lines long, 4-line broad, linear, obtuse or notched at the apex, magenta-purple. Stamens and staminodes about $1\frac{1}{2}$ line long. Stigmas 6, spreading, 1 line long, plumosely subulate, acute. Ovary partly superior, broadly dome-shaped on the top.

Ceres Division: North of Karoo Poort, Marloth 13,157.

The only known glabrous species with which this can be confused is *G. gibbosum*, from which the smaller size and much less unequal leaves are readily distinguished it.

PUNCTILLARIA, N. E. Br.

In the *Zeitschrift f. Sukkulantenkunde*, 1927, pp. 22-23, the species of this genus have been referred to *Fleiospilos*, N. E. Br., by Dr. Schwantes, who states that the fruit is alike in both genera. This is, however, a mistake, for in *Fleiospilos Bolusii* and *F. simulans* no tubercle is present at the opening to the cells, while in the fruits of all the species of *Punctillaria* that I have examined there are very evident tubercles, and this, together with a

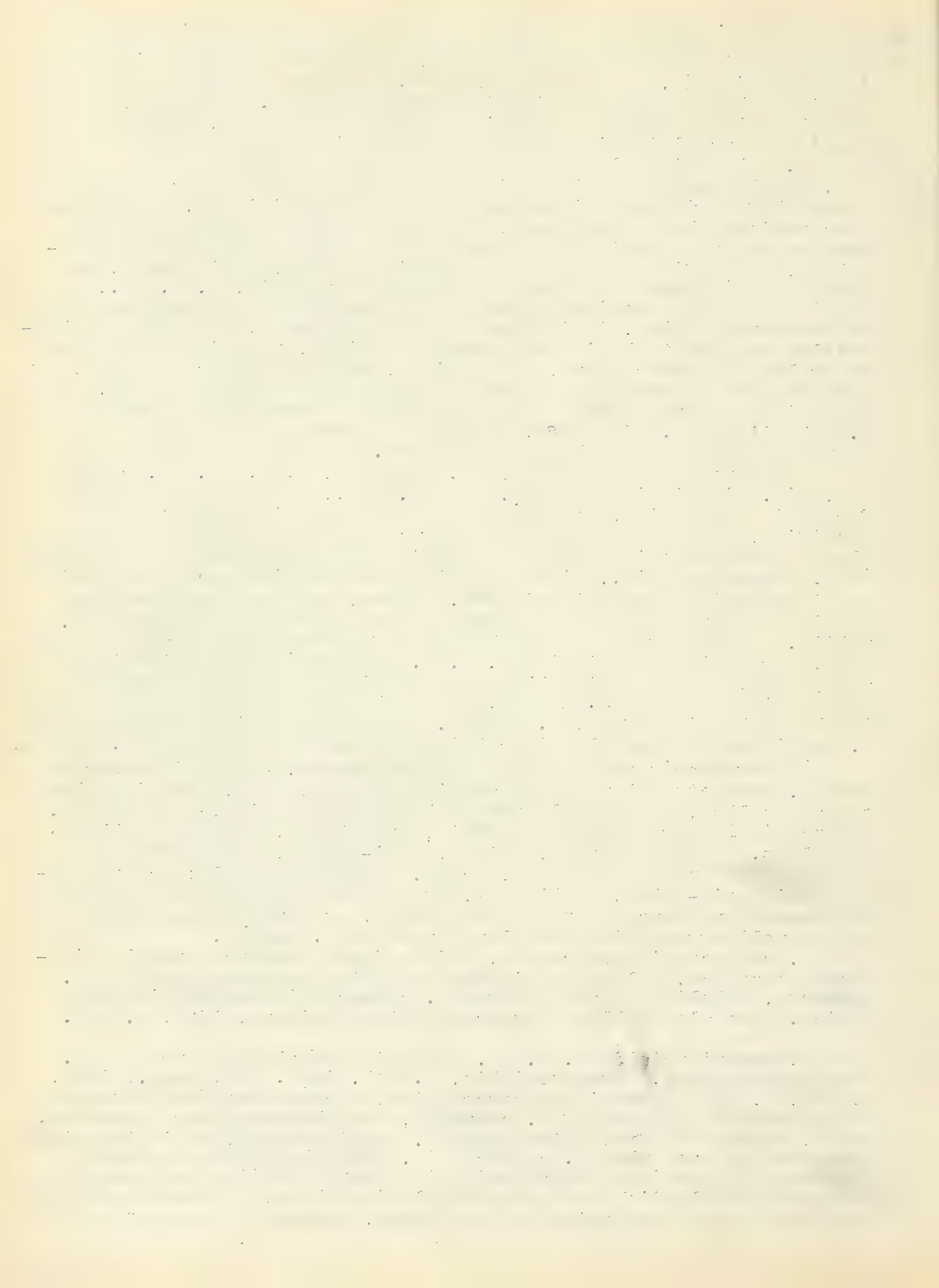
492 small difference in the marginal wings and the different leaves,
I have considered as being of sufficient importance to separate
them generically. In my original MSS. and keys, before I had
examined the fruits of *Pleiospilos Bolusii* and *P. simulans*, I
had also placed these two species under *Punctillaria*, and that is
why the genus *Pleiospilos* does not appear in Phillips' Genera of
S. Afr. Flowering Plants for I had sent the
493 MSS. of the genera published in that work to South Africa at least
a year before it was printed or my final keys finished. But from
discoveries I have since made, I think it probable that this and
one or two other fruit characters cannot always be accented as ab-
solute, for I find that the tubercle is present, rudimentary, or
absent in different specimens of *Disphyma australe*, N. E. Br.,
and in different species undoubtedly belonging to the same section
of *Mesembryanthemum*, it is also absent or present. So that if *Plei-*
ospilos and *Punctillaria* are hereafter united, then in accord with
the rules of nomenclature, *Pleiospilos*, being the smaller genus,
must be made a synonym of *Punctillaria*, which I had (in MSS.)
founded many months before I had a chance to examine the fruits of
P. Bolusii and *P. simulans*, and it is therefore really the oldest
genus of the two as well as the largest.

Schwantes also states that *P. compacta*, N. E. Br. (*M. compac-*
tum, Ait.) is distinct from *M. nobile*, Haw., but gives no reason
for their separation, nor any description by which they can be id-
entified, and I doubt very much if he has any knowledge of the
plant I feel sure if he has any knowledge of the plant I feel sure
is *M. compactum*, Ait., since it quite accords with such description
as Aiton (and Dryander in his MSS.) gives, and has also long been
cultivated (probably for over one hundred years) in England as *M.*
nobile. I have myself known the plant for over sixty years by that
name, for I first saw it in Mr. W. W. Saunders' fine collection
about 1865, and as that collection contained some of the remnants
of Haworth's type of *M. nobile*, and I also many times saw the plant
in the collection of Mr. T. Cooper. At the same time forms of
P. magnipunctata are also in cultivation under the name of *M. nobile*.

In Dryander's notes at the British Museum, I find it recorded
that *M. compactum* flowered at Kew in November, 1781, that its flow-
ers are yellow, and the "leaves as long and as thick, as a finger."
Dryander's Latin description of it, translated, reads as follows:
"Stemless. Leaves connate, dotted, semi-terete, triquetrous and
somewhat reflexed at the apex, acute. Flowers sessile; calyx sub-
cylindric, six-lobed." All this, except that he does not say that
the leaves are concave on the upper side, as Haworth describes them
to be, well agrees with the plant known as *M. nobile*.

P. compacta is not common, and to judge from the utterly diff-
erent plant Mrs. Bolus has figured under the erroneous name of *P.*
compacta, I believe that the true *P. compacta* is unknown in South
Africa. See also Mollers Deutsche Gertner Zeitung, 1922, p. 400.

P. sesquiuncialis N. E. Br. This is the plant figured as *P.*
magnipunctata var. *sesquiuncialis*, L. Bol. in S. Afr. Gard., 1927,
p. 326, f. 13. There is no description, except that "The dots are
not so marked as those of *P. compacta*, and the petals are narrower."
By "*P. compacta*" Mrs. Bolus means *P. magnipunctata*, as it is evident
she does not know what *P. compacta* is. But the figure represents
a plant with a pair of short and thick leaves similar to those of
Pleiospilos Bolusii; they are about 1½ inch long, 1½ inch broad and
1-1½ inch thick, according to the figure, obtuse at the apex and



493 bluntly keeled. The flower is represented as about $1\frac{1}{2}$ inch in diameter, with lax and narrow petals. It is certainly very distinct from *P. magnipunctata*, and bears no resemblance whatever to *P. compacta*.

Prince Albert Division: Hills near Prince Albert, Bolus.

P. Purpusii, N. E. Br.-- Plant similar to *P. magnipunctata*, but the leaves are often less stout, and are more acute, and the solitary and sessile flowers are quite different. Calyx cylindric, sub-equally 6-lobed; lobes $4\frac{1}{2}$ -6 lines long, lanceolate, acute, with narrow membranous edges. Corolla $2\frac{1}{2}$ -3 inches in diameter, expanding in the afternoon irrespective of sunshine and closing between 5 and 6 p.m., pleasantly scented; petals numerous, in 2-3 series, sometimes widely spreading, at other forming a somewhat funnel-shaped corolla, somewhat lax, 18-21 lines long, $2/3$ -4 line broad near the tips, thence gradually tapering downwards into a long, claw-like part, mostly more or less acute, sometimes obtuse, white for 8-9 lines of their length at the base, bright yellow at the upper part, and whitish-yellow, sometimes tinged with red, at the tips on the back. Stamens about 6 lines long, the central collected together, the outer gradually separating and loosely erect; filaments not bearded, white; anthers yellow. Glands very small, yellowish. Stigmas 10, about 8 lines long, filiform, with short hairs on the inner surface, exceeding the stamens and slightly recurved over them, yellow. Ovary flattish on the top.

Pleiospilos Purpusii, Schwant., in Mollers Deutsche Gartner Zeit., 1928, p. 46. Mesemb. nobile, Purpus in Monesschr.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 85: 34. 1929.

(Continued from page 493, Vol. LXXXIV.)

PUNCTILLARIA, N. E. Br.

34 *P. Purpusii*, N. E. Br. (continued.)-- Mes. nobile, Purpus in Monesschr. f. Kakteenkunde, 1907, p. 23 and 25, with fig., and in Mollers Deutsche Gartn. Zeit, 1911, p. 386 and 387, with fig., not of Haworth. *M. magnipunctatum*, Schwant. in Zeitschr. f. Sukk., 1926, p. 160, not of Haworth.

Willowmore Division: Near Miller, Frith. Marloth 6, 831.

Described and from living plants. It is one of those mentioned in the Gardeners' Chronicle, 1926, Vol. LXXX, p. 213, under *P. magnipunctata*, as being cultivated under that name. Its leaves, however, are usually less stout and more acute, and the long, slender, white bases of the petals give the flower a distinct appearance.

P. magnipunctata, N. E. Br.-- To this should be added as a synonym, *P. compacta*, L. Bol. in S. Afr. Gardening, 1927, p. 326, f. 12, which bears no resemblance to *P. compacta*, N. E. Br. (= *M. compactum*, Dit.), and is merely a small form of *P. magnipunctata*.

P. optata, N. E. Br.-- To this, I think, must be referred the plant wrongly identified with *Mesembryanthemum canum*, Haw., and figured as *P. canum*, Haw., by Mrs. Bolus in S. Afr. Gardening, 1927,

BIJLIA, N. E. Br.

Perennial succulent, stemless or tufted. Leaves opposite, obliquely and clavately trigonous, strongly keeled, whitish. Peduncle not exerted from between the leaves, 1-3-flowered, bracteate. Flowers pedicellate. Calyx sub-equally 5-lobed. Petals 2-seriate, free, cuneately linear. Stamens numerous, in an erect column, exposed to view to their base. Stigmas 5, filiform. Ovary inferior, 5-celled; placentas on the outer wall of the cell. Capsule shortly and broadly obconic, flattish, with raised sutures on the top, with 5 valves and cells; valves of expanded capsule inflexed and separating but slightly from one another, not spreading; expanding keels small, slightly prominent, about half as long as the valve and without marginal wings; cells acutely roofed with slightly stiff cell-wings, with acute depressions between the ridges, and the opening nearly closed by a large tubercle. Seeds several in each cell, ovoid, pointed at one end.-- N. E. Br. in Journ. of Bot., 1928, p. 267.

A monotypic genus native of South Africa.

The name is given in honour of Mrs. D. vander Bijl, who has very kindly sent to me specimens of this and other novelties. This genus is distinct in appearance, but more nearly allied to *Cerochlamys* than to any other genus.

1.-- *B. cana*, N. E. Br.-- Plant $1\frac{1}{2}$ inch to 2 inches high, forming clumps. Leaves opposite, in 1-3 pairs to a growth, incurved-spreading, and as received, 9-18 lines long, 4-6 lines broad and 3-4 $\frac{1}{2}$ lines thick at the base, and 5-9 lines broad and 4-8 lines thick near the apex, where the keel is dilated, clavately and often obliquely trigonous, obtuse, not toothed, flat on the face and often on one of the sides, the other side being (or sometimes both sides are) convex, strongly and usually obliquely keeled on the back, with somewhat sharp angles, firm, glabrous and smooth, whitish or whitish green, not shining. Cymes 1-3-flowered, with the peduncle not visible. Bracts $1\frac{1}{2}$ -3 lines long. Pedicels 1-5 lines long. Calyx-lobes about 2 $\frac{1}{2}$ lines in diameter; petals numerous, about 6-8 lines long and $\frac{1}{2}$ -1 line broad, cuneately linear, obtuse or notched at the apex, yellow. Stamens about 4 lines long, yellow. Stigmas 5, as long as or exceeding the stamens, filiform. Capsule as described for the genus, when closed 3-4 lines in diameter, and scarcely more when expanded, as the valves separate but slightly and remain inflexed, with the openings between them only $\frac{1}{2}$ -1 $\frac{1}{2}$ line wide (not widely spreading as represented by Mrs. Bolus). Seeds 4 line long, smooth, light brown, with a darker point.

N. E. Br. in Journ. of Bot., 1928, p. 268. *M. canum*, Haw., Obs., p. 158, Misc. Bot., p. 25, Synops., p. 219, and Rev., 86, not of Salm Dyck, Berger nor Karloth. *M. Tugwelliae*, L. Bol. in Ann. Bol. Herb., Vol. I, p. 129, and Journ. Bot. Soc. S. Afr., 1927, t. 3, f. 6. *Hereroa Tugwelliae*, L. Bol., Mes., p. 50-51, t. 20, and n. 143. *Juttadinteria Tugwelliae*, Schwant., in Zeitschr. f. Sukk., 1926, n. 184. *Bolusanthemum Tugwelliae*, Schwant in Gartenwelt, 1928, p. 514, and see also p. 544 under *Bijlia*.

Prince Albert Division: Among rocks near Prince Albert. Mrs. Tugwell, Mrs. D. van der Bijl. Introduced into cultivation at Lew by Masson in 1792, but soon died out.

Living specimens of this very neat and distinct-looking plant

34 were sent to me by Mrs. D. van der Bijl early this year, and I at once recognised it as being the long lost *M. canum*, Haw., and also as the plant Mrs. Bolus has figured and described as *M. Tugwelliae* without having identified it with the plant Haworth described as *M. canum* in 1795, and which soon died out of cultivation, and appears not to have been refound for over 120 years.

Mrs. Bolus, however, as mentioned under *Punctillaria optata*, has wrongly identified a *Punctillaria* as being *M. canum*, Haw., which is quite incomprehensible, for the species of *Punctillaria* have dull, greyish-green or brownish-green leaves that are conspicuously-dotted, never "hoaryish" nor yet at all like "stunted toothless leaves of *M. caninum*." Haworth makes no mention of dots, and he certainly would have done so if they had been present. His description is as follows: -- "Plant apparently stemless. Leaves 2 inches long, crossing each other in pairs, hoaryish (ilw., whitish), sub-acinaciform, rather hard to the touch and turgid; triquetrous, compressed, attenuate from the middle downwards; sharply keeled; keel hunching out towards the point, which is roundish, with a sharp keeled edge. The full-grown leaves resemble the stunted, toothless leaves of *M. caninum* exceedingly." This description exactly accords with *Bijlia cana*, and as *M. canum* was discovered by Lessou, who certainly collected in Prince Albert Division, it may even have been found by him in the same general locality as that from which Mrs. Tugwell and Mrs. van der Bijl obtained it.

Mrs. Bolus has placed the plant under the genus *Hereroa*, to which it bears no resemblance. And Schwantes, apparently without having seen the plant, first places it in the genus *Euttadinteria*, where it does not belong, and after I had already published the genus *Bijlia*, founded the genus *Bolusanthemum* for its reception, possibly unaware that there is already a well-known genus called *Bolusanthus*, with which it would probably be confused. And later, in *Die Gartenwelt*, 1928, p. 644, he appears to want to chop the poor plant in half and call each half a different species, since he states that the plant I have described is not the same as that Mrs. Bolus has described and figured as *M. Tugwelliae*. A view that no one who has the plant is likely to endorse.

N. E. Brown
(To be continued.)

MESEMBRYANTHEUM.

Gard. Chron. III. 85: 84. 1929.
(Continued from page 34).

17.--CRYOPHYTUM, N. E. Br.

84 *C. gibbosum*, N. E. Br.-- Annual, 4-11 inch high, with 2-3 pairs of opposite and widely spreading branches $\frac{1}{2}$ -2 inches long, each bearing 1-4 flowers at the end; whole plant glabrous and papulose, with about 4 papulae in the space of a line. Branches about 1 line thick at the upper part, fleshy, tapering downwards and becoming dry and rigid below, with internodes opposite 2-6 lines long, green or dark red. Leaves opposite, all withered on the specimens seen, 2-10 line long, ascending or spreading, apparently terete, obtuse, dilated into a flattened sheath and scarcely united at the base, papulose, and with or without marginal cilia at the base. Flowers bracteate, sessile. Calyx-tube above its union with the ovary, $\frac{1}{2}$ -line long, unequally 4-5-lobed above; lobes 12-24 lines long, subulate from a dilated base, which is more or less membranous and ciliate at the

84 margin, and with a stout and very conspicuous hump or compressed gibbosity $\frac{1}{2}$ -1 line long, spreading horizontally from the base of each. Corolla apparently 3-4 lines in diameter; tube about 1 line long; petals about $1\frac{1}{2}$ line long, white, sometimes tinted with lilac at the tips. Stamens few, 1-1 $\frac{1}{2}$ line long. Stigmas 4-5, erect, about $\frac{1}{2}$ -line long. Ovary half-superior, 4-5-angled, with 4-5 cells; placentas axile.

C. nodiflorum. L. Bol. in S. Afr. Gard., 1928, p. 84, f. 34, as to No. 3 only.

Fiquetberg Division: Eendekuil, Maughan Brown.

The gibbositities on the back of the calyx-lobes are remarkable, and unlike anything I have yet seen in this group.

C. nanum, N. E. Br.-- Annual, 1-3 inches high, branching from the base, coarsely papillate with glittering watery papillae, glabrous. Branches 1-3 inches long. Leaves opposite, petiolate, 1-2 inches long, $\frac{1}{2}$ -1 inch broad, spatulate-ovate or rhomboid-ovate, acute or acuminate, flat, more or less undulated, rather abruptly narrowed below the middle into a petiole $\frac{1}{2}$ -1 inch long and 2-4 inches broad, thick and fleshy, with a prominent midrib beneath, and much more coarsely papillate on the lower than on the upper surface, with the papillae $\frac{1}{4}$ - $\frac{1}{2}$ line in diameter, green or reddish. Flowers solitary or 2-5 in a cyme, terminal. Pedicels 1 line or less long, $1\frac{1}{2}$ -2 lines thick. Calyx produced above the ovary into a tube about 1 line long, sub-equally 5-lobed above, covered with large, glittering papillae $\frac{1}{4}$ - $\frac{1}{2}$ line in diameter, ovary, part sub-globose, $3\frac{1}{2}$ -5 lines in diameter; lobes apparently erect, 2-3 lines long and about the same in breadth, sub-orbicular, obtusely rounded at the apex. Corolla apparently not more than 6-8 lines in diameter; petals united below into a tube 2 lines long, with the free part $1\frac{1}{2}$ -2 lines long, with very slenderly filiform-linear, lilac-pink at the apical part, white at the basal part. Stamens in several series, the longer about 2 lines long, creamy-white. Stigmas 4-5, erect, with recurved tips, 2 lines long, filiform, white. Ovary half-superior, 4-5-celled. Capsule half-superior, 3-5 $\frac{1}{2}$ lines in diameter, 4-5-angled, with 4-5 raised and gaping sutures, with blackish-brown edges.

Malmesbury Division: Region of Saldanha Bay, Maughan Brown.

This species seems to be allied to the giants of the genus, *C. Berkleyi*, *C. grandiflorum* and *C. grandifolium*, but is very much smaller than any of them.

C. Bijliae, N. E. Br.-- Annual, about 6 inches high, glabrous, papulose. Stems several from the base, erect, cymosely branching at the top, apparently somewhat angular, with internodes $\frac{1}{2}$ -1 inch long, 1-1 $\frac{1}{2}$ line (or perhaps more when alive) thick, with distinct watery papulae. Leaves opposite on the stems, alternate on the flowering part, $\frac{1}{2}$ -2 inches long, 2-3 lines broad, 1 line thick, the lower more or less spatulate-ovate or spatulate-lanceolate, cuneately tapering into a petiole, the upper more or less cuneately-lanceolate or linear-lanceolate, obtuse or acute, slightly channelled above, keeled beneath, minutely papulose under a lens, green, often reddish at the edges. Flowers usually alternate and opposite a leaf along the branches of the cyme. Pedicels 2-3 lines long. Calyx acutely 5-angled on the ovary-part, somewhat unequally 5-lobed, minutely papulose; narrowly spatulate, obtuse. Corolla only seen in withered condition, with the tube $1\frac{1}{2}$ -line long, and the

84 free part of the petals 2 lines long, less than 1 line broad, linear, obtuse, stated to be creamy white, slightly tinted with pink at the tips on the under-side. Stamens in 4-5-series, white. Stigmas 5, erect, 1 line long, filiform. Ovary half-superior, conical and 5-angled at the top, papulose, 5-celled. Capsule 2½ 3 lines in diameter, when closed, 5-angled, of generic structure. Seeds less than ¼-line in diameter, compressed, D-shaped, minutely tuberculate, brown.

Mossel Bay Division: Near Great Brak River, Mrs. D. van der Bijl, 44.

Allied to *C. Rogersii*, L. Bol. and *C. Wilmaniae*, L. Bol., but with broader leaves, and an angular calyx, which is not nearly so coarsely papulose.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 86: 32. 1929.
(Continued from page 84, Vol. LXXXV.)

MONILARIA, Schwant.

32 Dwarf, bushy, succulent plants, two to four inches high, with crowded, erect, stout branches, constricted at the nodes into short and often bead- or button-like joints. Leaves opposite, of two kinds, and only one pair of each kind produced annually; the first pair to appear when growth commences are rudimentary and sometimes scarcely more than a short, fleshy sheath, with its semi-circular lips closed together into a bag-like or globular body, but by the growth of the second pair of leaves the lips are pushed apart and remain surrounding the base of the joint formed by the second pair, which are long and nearly cylindrical, and more or less flattened on the upper side, and very shortly united at the base, papulose. Flowers solitary, terminal; pedicels long, papillate, with a pair of rudimentary leaves sheathing the base. Calyx papulose or papillate, unequally 5-lobed down to its union with the ovary, with the ovary-part shallow and convex beneath. Petals numerous, erect in a column, or later becoming more or less loose; filaments not bearded at the base. Stigmas 5-7, stoutly ovoid-subulate, acute. Ovary inferior, shallow, 5-7-celled, with 5-7 sutural ridges on the flat top; placentas on the floor or outer wall of the cells. Capsule shallow, very shortly and broadly obo-conic, with 5-7 very prominent and thin sutural ridges on the flat top, and 5-7 valves and cells; valves reflexed or widely spreading; expanding keels more or less widely diverging, broad and flattish at the basal part, with the inner edges raised, and with narrow marginal wings; cells shallow, somewhat acutely roofed with membranous cell-wings; no placental tubercle. Seeds numerous in each cell, ovoid, pointed at one end, smooth.-- Schwantes in Gartenwelt, 1929, p. 69.

Species 3; natives of Little Namaqualand and Van Rhynsdorp Division of South Africa and type of the genus is *M. moniliformis*.

The name is derived from the Latin, monile, a necklace, in allusion to the manner in which the stems are constricted into bead-like joints.

The remarkable group of plants comprising this genus is among those I intimated in The Gardeners' Chronicle, 1925, Vol. LXXVIII,

32 p. 412, that would probably have to be separated generically from *Mesembryanthemum* when better known. But as at that time I had not seen flowers or fruits of any species belonging to the group, I was unable to assign characters whereby to separate it; and previously I had associated the species with those now placed under the genus *Mitrophyllum*, in which I was at first followed by Schwantes, who enumer-
 33 ates the species under a section of that genus, but without a work of description by which it could be identified. Recently, however, he has separated it as a distinct genus, in which opinion I agree with him, for having been able during the past four years to study living plants in the adult and seedling stages of *Monilaria* and *Mitrophyllum*, I find they differ so conspicuously in vegetative characters, long pedicels, stout stigmas, and slightly in fruit, that I no longer hesitate to consider them as distinct genera, especially as *Monilaria* is easily distinguished from all its allies by the stems and leaves alone.

From *Mitrophyllum* it differs in its peculiar mode of growth, as follows:-- The first of the two annual pairs of leaves is rudimentary, consisting of a pair of very short, fleshy, hemispherical lobes united at their base and at first closed together into a small hemispherical body (see Fig. 14, p. 29 of *M. moniliformis* commencing to vegetate), which become separated as the second pair of leaves develop. This second pair are long and sub-terete, and are but very shortly united into a sheath at the base above the short, bead-like internode from which they arise. This short sheath ultimately either decays or hardens into a short, free, cup-like, dark brown sheath terminating the internode and enclosing the next pair of rudimentary leaves, which ultimately disappear and leave the sheath surrounding the base of the internode above it, as is well seen in the stems of *M. pisiformis* and *M. chrysoleuca*. In *Mitrophyllum* the first pair of leaves are long, not sub-terete, and free except at the very base; and the second pair are united into a long cone with free, leafy tips or short, blunt points.

The following are the first complete and illustrated descriptions of these very curious and interesting plants that have ever been published.

Key to the Species.

1. Joints of the stem twice or more than twice as thick as long, button-like or depressed-globose, not produced above into a short sheath, greyish; petals white; filaments and anthers yellow. *M. moniliformis*.
2. Joints of the stem usually (but not always) as long as or longer than thick, more or less bead-like, produced above into a short sheath enclosing the base of the joint above it, smooth and hard, dark brown.
 Joints of the stem ellipsoid or sub-globose; petals stated to be yellow at the tip, then white, and pink at the base; stamens with red filaments and yellow anthers. *M. pisiforme*.
3. Joints of the stem somewhat compressed and obscurely 4-angled; petals white; filaments and anthers deep yellow. *M. chrysoleuca*.

M. moniliformis, Schwant. in *Gartenwelt*, 1929, 60.-- Plant

33 much branches, 2-4 inches high when at rest; branches erect, often crowded, 5-7 lines thick, constricted at the nodes, with short, depressed-globose or button-like joints, $1\frac{1}{2}$ -3 lines long, greyish. Primary leaves 1-2 $\frac{1}{2}$ lines long, 4-6 lines broad and 2-3 lines thick, semi-circular in outline, with a minute point at the rounded apex, flat above, convex beneath, smooth, glabrous, not papulose, green. The second pair of leaves 2-3 $\frac{1}{2}$ inches long, 2-2 $\frac{1}{2}$ lines thick, slightly flattened on the upper obtuse, densely covered with minute, glittering papulae, somewhat bluish-green. Pedicels 2-3 inches long, coarsely papillate. Calyx flattened at the base, coarsely papillate; lobes 4-8 lines long, the outer 2 $\frac{1}{2}$ -3 lines broad, ovate, with leafy tips, the inner 3 $\frac{1}{2}$ -4 $\frac{1}{2}$ lines broad, elliptic, with broad, membranous margins. Corolla 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ inches in diameter, opening between 11 and 12 a.m. and closing between 2 and 3 p.m.; petals in about 3 series, 6-9 lines long, $\frac{1}{2}$ -1 line broad, linear, obtuse and more or less notched at the apex, pure white, shining. Stamens about 2 lines long, at first in a column, afterwards loosely separating; filaments and anthers deep yellow. Stigmas 5, about 1 line long, stout, ovoid-subulate, acute, erect or ascending, yellowish. Ovary with 5 wing-like sutural ridges on the flat top, green. Capsule when closed about 7 lines in diameter and when expanded 10-11 lines in diameter, inner edges of the expanding-keels fringed with fine teeth. Seeds nearly $\frac{1}{2}$ -line long, pale brown with a darker brown point.

Mesembryanthemum moniliforme, Thunb., in Nov. Act. Acad. Leop.-Cur.-Ehem., Vol. VIII, Append., p. 7 (1791), Prod., p. 88, and Fl. Cap., ed. Schult., p. 413; Haw. in Obs., p. 132 and 441, Misc. Nat., p. 24, Synop. p. 207, and Rev., p. 97; K. E. Br., in Journ. Linn. Soc., Vol. XLV, p. 116, t. 5, f. 10 (drawn from memory), and in Botania, Vol. I, p. 152; Berger, Mes. und Port., p. 56. *Mitrophyllum moniliforme*, Schwant. in Zeitschr. f. Sukkulent, 1926, p. 182. *Conophyllum moniliforme*, Schwant, in Zeitschr. f. Sukkulent, 1928, p. 322.

Van Rhynsdorp Division: On hills near Olifants River, towards the north, Thunberg, Mrs. E. Rood.

This curious plant was introduced into New Gardens by Lesson in 1794, but appears to have soon died out. The above description was made from living plants and withered flowers sent to me by Mrs. E. Rood, for Thunberg's type is both leafless and flowerless having collected when in a state of rest. The illustrations are from photographs kindly sent to me by Mr. T. N. Leslie. Fig. 14 and Fig. 19 the same plant when in flower.

34 *M. pisiformis*, Schwant. in Gartenwelt, 1929, 69--- Plant compactly much branched, 2 $\frac{1}{2}$ -4 inches high when at rest and leafless. Branches erect, 3-4 $\frac{1}{2}$ lines thick, constricted at the nodes into bead-like, sub-globose or ellipsoid joints, varying from 2-5 lines long, glabrous, smooth, brown or greyish-brown. Primary leaves 2-3 lines long, 3-4 lines broad, semi-circular in outline, flat above, convex beneath, glabrous, smooth, green. The second pair of leaves 1-3 inches long, 2-2 $\frac{1}{2}$ lines thick, sub-terete, slightly flattened on the upper side, very rounded on the back, very obtuse, minutely papulose and glittering, green. Pedicels 2-3 inches long, papillate. Calyx coarsely papillate; lobes 4-8 lines long; the outer ovate at the base, with leaf-like tips; the inner elliptic or elliptic-ovate, with broad, sub-membranous margins. Corolla 1 $\frac{1}{2}$ -1 $\frac{1}{2}$ inch in diameter, open in the afternoon; petals in about 3 series, 7-8 lines long,

34 linear, acute, obtuse or slightly toothed at the apex, they are stated to be "top yellow, then white, then pink". Stamens about 2 lines long; filaments red; anthers yellow. Stigmas 5-6, about 1 line long, erectly spreading, stout, ovoid-subulate, acuminate, yellow. Ovary with 5-6 wing-like sutural ridges on the flattened top. Capsule 4½-6 lines in diameter and 2 lines deep when closed, 6½-8 lines in diameter when expanded; inner edges of expanding-keels entire. Seeds about 4-line long, pale brown with a darker brown point.

Mesembryanthemum pisiforme, Haw. in Misc., Nat., p. 23, Synop., p. 206, and Rev., p. 97; Berger in Mes. und. Fort., p. 56. *Mitrophyllum pisiforme*, Schwant. in Zeitschr. f. Sukkul., 1928, p. 182. *Conophyllum pisiforme*, Schwant. in Zeitschr. f. Sukkul., 1928, p. 322.

Van Rhynsdorp Division: Van Rhynsdorp Karoo, Mrs. E. Rood.

Described from living plants, which I owe to the kindness of Mrs. Rood. It differs from *M. moniliformis* by its brown (not greyish) stems, rather smaller flowers, with the petals less crowded, and the red filaments of the stamens. The figures are from photographs sent to me by Mr. T. M. Leslie. Fig. 20 represents the plant at rest, and Fig. 21 when in flower.

M. chrysoleuca, Schwant. in Gartenwelt, 1929, p. 69.-- Plant 3-4 inches high, compactly branched. Branches [compressed and obscurely 4-angled, 4-6 lines broad and 3-4 lines thick], with joints 2-4 lines long, each old joint with a hard and somewhat rigid, dark brown skin or adherent sheath having its upper part free and forming a cup-like sheath surrounding the base of the joint above it. Primary pair of leaves about 1½-2 lines long, [fleshy and somewhat hemispherical when alive, united into one body for half of their length and closed together]; from between them the second pair emerges, borne on a short, compressed joint or internode; these leaves are 2-3 inches long and 2-2½ lines thick, sub-terete, slightly channelled or flattened on the face, obtuse, papulose. Pedicels 2-3 inches long, papulose. Calyx papulose, the longer lobes 6-7 lines long, lanceolate or oblong-lanceolate, obtuse, and the shorter lobes about 4 lines long, with broad, membranous margins. Corolla about 1½ inch in diameter; petals in 3-4 series, 7-8 lines long, 1-1 line broad, cuneately linear, acute, obtuse or slightly toothed at the apex, white. Stamens about 2-2½ lines long; filaments and anthers of a rich deep yellow. Stigmas 5, about 1-1½ line long, stoutly subulate. Fruit not seen.

Mesembryanthemum chrysoleucum, Schlechter in Engl. Bot. Jahrb., Vol. XXVII, p. 126 (1899); Berger in Mes. und Fort., p. 56. *M. scutatum*, L. Bol. in Ann. Bot. Herb., IV., p. 73 (1927), in J. Afr. Gard., 1928, p. 127 and p. 126, f. 4. and in Mes., p. 59, f. 4 and 60, with Fig. *Mitrophyllum chrysoleucum*, Schwant. in Zeitschr. f. Sukkul., 1928, p. 322. *Monilaria scutata*, Schwant. in Gartenwelt, 1929, p. 69.

Van Rhynsdorp Division: Karoo Bergen, Schlechter 8, 292.

Little Namaqualand: near Walle Kraal, Pillans 17,794.

I am indebted to Mr. T. M. Leslie for a living plant, flowers and photographs of this interesting species. Mr. Leslie's plant, here figured, was received from Mr. Pillans and is his No. 17,794, which has been described by Mrs. Bolus as *Mesembryanthemum scutatum*, but I am unable to distinguish it in any way from *M. chrysoleucum*. The words in the description that are between square brackets [] are

34 from this living plant, but all the rest of the description is made from a type specimen of *Michryssoleucum*, which has been so crushed in pressing that the stem and leaves do not show their true form. Fig. 12 p. 25 represents the plant just commencing to produce its leaves, and Fig. 13 p. 27 the same plant when in flower.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 86: 208. 1929.

(Continued from page 34.)

MITROPHYLLUM, Schwant.

208 Shrublets or rarely stemless perennials, of remarkable habit. Stems all with distinct internodes, or with internodes only developed on the flowering stems, the vegetative shoots then being without developed internodes, or in two species (of one of which the flower and fruit is unknown) apparently entirely stemless. Leaves opposite, two pairs only produced at the first pair free except at the very base, flat above, rounded or keeled on the back; the second pair united from a third part to nearly all of their length into a conical or rarely cylindrical body, minutely crystalline-papulose, especially at the tips. Flowers solitary or developing to lax cymes when in fruit, terminal, pedicillate, with or without bracts. Calyx sub-equally 5-lobed to its union with the ovary. Petals numerous, free, in 3 or 4 series, linear. Stamens numerous, erect, in a column. Stigmas 5-7, subulate. Ovary inferior, with 5-7 sutural ridges on the flat top and 5-7 valves and cells; expanding-keels usually diverging from the base, with incurved tips, sometimes sub-parallel, broad and flat, with the inner edge raised, with membranous margins; cells shallow, with or without membranous cell-wings. Seeds ovoid or Pear-shaped.-- Schwantes in Zeitschrift f. Sukkulentenkunde, 1926, p. 181. Conophyllum, Schwantes, in the same volume, p. 321.

Species several, natives of Little Namqualand. For the type of the genus see later.

The name is derived from the Greek, mitra, a mitre, and nhyllon, a leaf, in allusion to the shape of the united pairs of leaves.

The plants comprising this genus are among the most remarkable of flowering plants, and very interesting on account of their vegetative peculiarity. When in a state of rest each growth or branch terminates in a conical or rarely cylindric, fleshy body. Within this cone, during the months of rest, a pair of leaves, free almost to the base, is being developed, quite invisibly, at the expense of the tissue of the cone, until finally the substance of the latter is all absorbed, except a thin skin that covers and conceals the leaves inside. When the growing period arrives, these leaves burst the skin, increase in size, and spread widely, and from between them arises another pair of leaves united for part or nearly the whole of their length into a cone or cylinder. This cone is sometimes supported upon an internode of stem and sometimes sessile between the spreading leaves, and when the dry season comes the latter wither and dry up, and the cone persists, to repeat the development above described.

This mode of growth is, of course, only a modification of that of the genus *Cheiridopsis*, to which *Mitrophyllum* seems to be in some way allied, for the genus comprises two groups, one in which the vegetative and flowering growths are both alike, are permanent and have distinct internodes, and another group in which the permanent vegetative part of the plant is practically stemless and sessile on the ground, without internodes, but produces tall flowering stems with distinct internodes, which die after fruiting. A vegetative growth of this latter group with its free leaves spreading close to the ground, and the cone of united leaves arising from between them, in habit is so very similar to *Cheiridopsis peculiaris* in the same condition of growth, that without seeing flowers and fruits most people would probably consider them to belong to the same genus.

This remarkable group is one of those I alluded to in *The Gardeners' Chronicle*, 1925, Vol. LXXVIII, p. 412, as being left under *Mesembryanthemum* when my key to the genera was constructed, because I had no fruits or adequate material by which to separate them. Schwantes, however, has rightly separated the group and founded the genus *Mitrophyllum* for its reception at the place above quoted, under the following structural characters:-- Flower solitary, terminal, bractless, sometimes breaking through the body of the cone, with shorter or longer pedicels. Calyx 4-5-lobed. Petals in several series, linear, white or pink. Stamens numerous, spreading. Stigmas 7, subulate, as long as or shorter than the stamens. Capsule 7-celled; cells with cell-covers; placentas parietal, without placental tubercles; expanding-keels diverging upwards, with moderately broad wings. Seeds unknown.

It is not stated from which species these characters were derived nor which is the type of the genus. But in the very same volume, p. 321, he divides *Mitrophyllum* into two genera, and states that *M. mitratum* is the type of that genus, which he there defines as follows:--"Pedicel with two short, thick bracteoles at the base. Petals and stamens numerous. Stigmas 5, filiform. Capsule 5-celled, without cell-covers; expanding-keels parallel, not touching one another, with small, marginal wings. Seeds Pear-shaped, slightly narulose."-- Now, these characters, stated to be derived from *M. mitratum*, are so different from those of his original description (quoted above), that it is obvious that both sets of characters could not possibly have been made from the same species, and, have been made from the same species, and, therefore, *M. mitratum* cannot be the type of the genus as originally established. For it is those original characters that must be maintained for the genus, as it is not permissible and is against all rule and precedent to deliberately change the characters of a genus in this way, unless it can be demonstrated that a mistake has been made, but here is no mistake, for the characters of his first description do apply to certain species, and, moreover, we also find that Schwantes actually uses them (at the same place quoted) to found his genus *Conophyllum*, which must, therefore, rank as a synonym of *Mitrophyllum*.

With reference to *M. mitratum*, the only claim to generic distinction is that the cells of its fruit have no cell-wings and the expanding-keels are parallel instead of divergent, for there is no other difference. I regard this as merely a structural variation among species belonging to the same genus, because among the large number of fruits I have examined I find that although fruit-structure is fairly constant and reliable (in conjunction with vegetative char-

208 actors) for distinguishing genera, yet here and there among species that unquestionably belong to the same genus variations occur in fruit-structure that must be disregarded from a generic point of view; such characters as the presence or absence of placental tubercles, presence or absence or rudimentary development of cell-wings and the contiguity or separation and divergence of the expanding-keels, are all liable to variation occasionally. Therefore, I regard *M. mitratum* as not generically distinct from the others enumerated here, but it cannot be accepted as the type of the genus, as the structure of its fruit is stated to be different from that originally assigned to *Mitrophyllum*. I have only seen fruit of *M. grande*, which was attached to the plant and exactly conforms with the characters of the fruit as described originally by Schwantes, and as he has not mentioned which of the known species is the type from which the characters of his original description were made, I propose that *M. grande* be taken as the type of the genus.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 86: 227. 1929.

(Continued from page 208.)

MITROPHYLLUM, Schwant.

Key to the species.

- 227 1. Plants in flower not more than about 1-1½ inch high. 8. *nanum* and *Schickianum*.
Plants from a few inches to two feet high. 2
2. United pairs of leaves forming conical bodies stouter than the branches that they terminate. 3
United pairs of leaves forming cylindric bodies not stouter than the branches they terminate; dwarf shrublets 6-12 inches high, with distinct internodes. 7
3. Internodes distinctly developed on both vegetative and flowering parts of the plant and varying from 1-1½ inches long and 1½-3 inches thick. 4
Internodes of the vegetative growths suppressed and crowded together or not more than about 1-1½ lines long; those of the flowering parts elongated and 1-3 inches long. 5
4. Internodes 1-2½ inches long, and their terminal cone separated from the lateral cones next below it by an internode 1-2½ inches long; free leaves 4-6 lines broad at the base; petals yellow. 5. *dissitum*.
Internodes 1-1 inch long, and the terminal cone subsessile among the lateral cones or only separated from them by an internode 2-6 lines long; free leaves 4-7 lines broad at the base; flowers unknown. 4. *proximum*.

5. Vegetative cones 2-3 inches long and an inch or more thick, all basal and practically stemless, being permanently clustered close to the ground; flowering stems arising from vegetative growths and 6-16 inches high, with internodes $1\frac{1}{2}$ -3 inches long, dying after fruiting; free leaves 1-1 $\frac{1}{4}$ inch broad at the base; petals white. 1. grande.

Vegetative cones 9-16 lines thick at the base, not basal, mostly solitary at the ends of branches and mixed with the flowering growths on various parts of the shrublet; free leaves 6-12 lines broad at the base. 6

6. Cones 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ inches long; internodes of the flowering branches 3-12 lines long and the lower one not resembling a long peduncle; pedicels about 6 lines long; petals white at the base, pale pink at the upper part. 3. mitratum.

Cones 2-3 $\frac{1}{2}$ inches long; lower internode of the flowering branches 4-5 inches long, about half as thick as the internode below it and resembling a peduncle; pedicels an inch or more long; petals pure white. 2. Pillansii.

7. Stem and branches more or less distinctly constricted at the nodes; flowers and fruit unknown. 7. clivorum.

Stem and branches more or less thickened (never constricted) at the nodes; flowers and fruit unknown. 6. cognatum.

These plants are not exactly easy to cultivate. They require a good sandy soil and are best watered from below, by standing their pots in saucers of water occasionally, and when the vegetative season commences their roots should not be allowed to completely dry up, at the same time they must not be overwatered, for in the region they inhabit they only receive three or four inches of rain per annum, and subsist for the greater part of their life upon dew or moisture condensed about their roots. Cuttings of some species do not root very readily, but in my experience the best time to take cuttings is in July.

1. *M. grande*, N. E. Br. (Fig. 112).-- Plant with basal vegetative growths all without internodes and seated on the ground and persisting, each growth finally producing a branching stem with elongated internodes, which dies after flowering and fruiting. In the axils of the leaves at the base of the flowering stem are a pair of sessile leaf-cones that carry on the vegetative growth. When at rest, the vegetative cones are 2-3 inches long, an inch or more thick at the base, and somewhat resemble the pseudo-bulbs of an Orchid in appearance; the free leaves are 3-4 inches long and 1-1 $\frac{1}{4}$ inch broad at the base, thence tapering to an obtuse point, flat on the face, rounded at the back, glabrous, light green in colour. Flowering stem 6-16 inches high, with internodes 4-4 inches long and 1 $\frac{1}{2}$ -4 lines thick, somewhat compressed and 2-edged, branching in a forked manner, with the branches erect and bearing reduced leaves at the nodes, and a flower in each fork or at the apex. Pedicils 2-3 lines long on native plants, about 1 $\frac{1}{2}$ line thick,

27 thickening upwards, compressed, papulose. Calyx (only seen on a withered flower) sub-equally 5-lobed, with the ovary part very shallow and broad, and lobes 4-5 lines long, $2\frac{1}{2}$ - $3\frac{1}{2}$ lines broad, probably larger than alive, oblong, obtuse, 3 of them with a short dorsal point. Corolla $2-2\frac{1}{2}$ inches in diameter, expanding after noon; petals in about 3 series, 9-12 lines long, about $\frac{1}{2}$ -1 line broad, linear, white, shining. Stamens about 2 lines long; filaments white; anthers yellow. Stigmas 5, subulate, about $1\frac{1}{2}$ line long. Ovary with 5 ridges on the flat top. Capsule when closed 5- $5\frac{1}{2}$ lines in diameter, very shortly and broadly obconic, with 5 valves and cells, grey; when expanded about 8 lines in diameter; valves spreading horizontally, deltoid; expanding-keels broad and flattish, elevated at the inner edge, diverging from the base, with incurved,awn-like tips and broad membranous margins; cells somewhat acutely roofed with membranous cell-wings. Seeds nearly $\frac{1}{2}$ -line long, Pear-shaped, smooth, light brown.

Mesembryanthemum proximum, L. Bol. in S. Afr. Gard., 1927, p. 239, Fig. 3, and Notes on Mesemb., I., p. 70, Fig. 3, not of N. E. Br.

Little Namaqualand: On hills north of Brekfontein, Pillans 4,933.

28 So far as known to me, this fine species stands alone among those in this genus that have tall flowering stem in having its vegetative growths seated on the ground without internodes between the successive growths. It is incomprehensible how it could possibly have been mistaken either for *M. proximum*, as it in no way agrees with either my figure or description of that species, which bears its growths in clusters at the ends of the branches. Fig. 112 represents a & two growths from a clump with a flowering stem derived from a previous sessile cone arising from between them, of which a portion is omitted from the drawing. This flowering stem is probably two or three years old, its lower part bears fruit, and the terminal part has a withered flower and two flowering cones.

Seedlings of this species have the cotyledons as presented at Fig. 112 C, and the succeeding stages as shown in the same figure at D-G; D and E represent seedlings of one year's growth preparing to go to rest; F, a seedling at rest, but about to resume growth in the second year; G, the same at a later date when forming a fresh cone, and with the remains of the skin of the old cone (F) clinging to it. These young cones are of a somewhat translucent light green, and glitter as if covered with minute, watery papulae, but under a lens the cells are seen to project as papulae only on the lobes, elsewhere they do not project into distinct papulae.

2.-- *M. Pillansii*, N. E. Br.-- Plant 12-16 inches high. Branches 5-6 lines thick, with the internodes on the vegetating parts 2-3 lines long, crowded, and on the parts about to flower longer and up to 14 lines long, the vegetating and flowering parts intermingled. Cones 2-4 inches long, $1-1\frac{1}{2}$ inch thick at the base. Free leaves $4-4\frac{1}{2}$ inches long, $\frac{2}{3}$ -1 inch broad and $\frac{1}{3}-\frac{1}{2}$ inch thick at the base, thence tapering to a sub-acute point, very minutely papulose. Flowers solitary, terminal, the first one on a peduncle 4-5 inches long and $2-2\frac{1}{2}$ lines thick (equivalent of the lower part of the flowering branches in the other species), with a pair of reduced leaves or bracts at its apex, from the axils of which small secondary flowering cones arise. Pedicel about $1\frac{1}{2}$ inch long. Calyx

28 with the longer lobes 8-9 lines long, and the three shorter lobes with membranous margins. Corolla $1\frac{1}{2}$ -2 inches in diameter, opening in the afternoon, scented; petals in 3-4 series, 5-9 lines long, $\frac{1}{2}$ -1 line broad, linear, subacute or obtuse, white. Stamens in a column about 4-4 $\frac{1}{2}$ lines long and 5-6 lines in diameter, with the outer spreading away from the rest; filaments white, anthers yellow. Stigmas 5, about $\frac{1}{2}$ inch long, exceeding the stamens, subulate, green. Ovary conical and stoutly 5-ridged on the top. Capsule shortly and broadly obconic, about 7 lines in diameter when expanded; expanding-keels closely parallel or nearly contiguous, with narrow marginal wings; cell-wings rudimentary.

M. mitratum, L. Bol. in Fl. Po. of S. Afr., Vol. VII, t. 274, not of Schwantes, nor *Mesembryanthemum mitratum*, Marl.

Little Namaqualand: On hills about six miles north-east of Oograbies Poort, Pillans 4,690.

Although figured as being *M. mitratum*, Schwant., this plant conspicuously differs from that species by its larger vegetative cones, the much more slender and very long and peduncle-like lower part of the flowering branch, longer pedicels and much larger and differently-coloured flowers.

3.--*M. mitratum*, Schwant. in Zeitschr. f. Sukkulent, 1926, p. 182, and 1928, p. 321; not of L. Bol.-- A shrublet about 1-2 feet high, with vegetative and flowering growths intermingled on the branches. Vegetating branches 6-7 lines thick, with very short, crowded internodes 1-2 lines long, and the flowering branches about 3 lines thick, with internodes $\frac{1}{2}$ -1 inch long, dark brown. When at rest a vegetative one is represented as about 2 $\frac{1}{2}$ inches long and about an inch thick at the base, and a flowering cone about 1 $\frac{1}{2}$ -1 $\frac{1}{4}$ inch long and $\frac{1}{2}$ inch thick. Leaves not represented nor described. Pedicels represented as less than half-an-inch long, and as arising from the axil of the one of the old leaves of a flowering cone, but the flower is described as forcing "its way out through a slit at the side" of the cone. Calyx 5-lobed, three of the lobes with membranous margins. Corolla represented as about $\frac{1}{2}$ inch in diameter; petals linear, white at the base, pale pink at the upper part.

Mesembryanthemum mitratum, Marl., in Tr. Roy. Soc. S. Afr., Vol. II, p. 35, t. 1, f. 4 (1910), and Fl. S. Afr., Vol. I, p. 205, t. 51, f. C.

Little Namaqualand: Sandy deserts east of Port Nolloth, Alston, in Herb. Marloth 4,690.

This species is unknown to me and evidently it is not the same as the plant figured by Mrs. Bolus under the name of *M. mitratum*, its cone being smaller, flowering in a different colour.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM

Gard. Chron. III. 86: 248. 1929.

(Continued from page 228.)

MITROPHYLLUM, Schwant.

48 4.--*M. proximum*, Schwant. in Zeitschr. f. Sukkulent., 1926, p. 182.-- A shrublet 8-12 inches high (Fig. 122), which branches 2-3 lines thick, terete, slightly thickened at the nodes and with in-

248 ternodes $\frac{1}{2}$ -1 inch long, glabrous, dark violaceous-grey. Vegetative and flowering growths intermingled on the branches, and the main or terminal cones clustered among the lateral cones at the ends of the branches and sub-sessile, or supported upon an internode 2-6 lines long. Cones $\frac{1}{2}$ -3 (rarely 4) inches long, 5-9 lines thick at the base; free leaves $\frac{1}{2}$ -3 inches long, 4-7 lines broad at the base, thence tapering to an acute or sub-acute apex, concave, flat or slightly convex on the face, obtusely keeled on the back, light green, minutely papulose as in the other species. Flowers and fruit unknown.

Mesembryanthemum proximum, W. E. Br. in Journ. Linn. Soc. Vol. XLV, p. 117, t. 5, Figs. 3 and 4; Gard. Chron., 1921, Vol. LXX, p. 223, Fig. 95. *Conorhyllum proximum*, Schwant. in Zeitschr. f. Sukkulent 1028, p. 322.

Little namaqualand: Without precise locality; Pearson.

Fig. 117 represents a branch of the type plant when first imported. Fig. 12 represents a similar cluster of growths eighteen months after the branch bearing them had rooted, both figures of natural size, which clearly show how very different it is from *M. grande*, which has been mistaken for it in S. Africa.

5.-- *M. dissitum*, Schwant. in Zeitschr. f. Sukkulent, 1926, p. 182 (Fig. 123).-- A shrublet 12-18 inches high, with vegetative and flowering growths on the same branches, which are permanent. Branches $\frac{1}{2}$ -2 lines thick, or thicker under cultivation, with internodes 1-2 $\frac{1}{2}$ inches long, and a distinct and long internode always separating the main cones from the free pairs of leaves from which they arise, glabrous, reddish-brown, becoming dark grey with age. When at rest the vegetative cones are 1-2 inches long, 3 $\frac{1}{2}$ -5 inches thick; the free leaves are $\frac{1}{2}$ -2 inches long, 4-6 lines broad at the base, thence tapering to an acute apex, flat or slightly concave above, obtusely keeled or rounded on the back; both pairs of leaves are glabrous and in their earliest stages minutely crystalline-papulose, with longer and acuter papulae along the edges at the tips, which at length disappear, green, or with reddish tips. Flowers solitary, terminal, becoming lateral in fruit. Pedicels about 6 lines long, papulose. Calyx-lobes 5-8 lines long. Corolla $\frac{1}{2}$ -1 $\frac{1}{2}$ inch in diameter, expanding in the middle of the day; petals numerous in 3-4 series, linear, sub-acute, light yellow. Stamens about 2 $\frac{1}{2}$ -3 lines long, at first collected into a cylindric column; white, with pale yellow anthers. Stigmas 5, about 3 lines long, slenderly subulate. Ovary raised and 5-ridged on the top. Capsule when expanded about 10-11 lines in diameter, with 5 valves and cells; expanding keels flat, diverging nearly or quite from the base, with the inner edges toothed and with rather narrow marginal wings; cells somewhat acutely roofed with membranous cell-wings. L. Boll in Fl. Pl. of S. Afr., Vol. VII, t. 272.

249 *Mesembryanthemum dissitum*, W. E. Br., in Journ. Linn. Soc. Bot. Vol. XLV, p. 114, t. 5, Fig. 9, and t. 6, Fig. 11. *Conophyllum dissitum*, Schwant. in Zeitschr. f. Sukkulent, 1928, p. 32. Little Namaqualand: Among bushes on the upper slopes of hills above Daunabis; Pearson, 6, 116.

This very distinct species is easily recognised by its long internodes. Fig. 123 represents a rooted cutting in its resting stage, from which it will be noted that the central cone is formed at the end of a long internode.

6.-- *M. cognatum*, Schwant., in Zeitschr. f. Sukkulent, 1926,

249 p. 182.-- A much-branched shrublet about a foot high (Fig. 124). Main stem 5-7 lines thick, branches 3-4 lines thick, with internodes 1-1 inch long, and more or less thickened at the nodes, glabrous, brown under cultivation, pale grey when imported. United pairs of leaves forming cylindric bodies 7-15 lines long, similar to and continuous with the stem or very slightly thicker than the latter at their base, ending in a pair of widely spreading or recurving leafy tips, 1-2 inches long, about 2 lines broad at the base, thence gradually tapering to a sub-obtuse apex, channelled down the face, obtusely keeled down the back; the free leaves 1-1 inch long, 3-4 lines broad at the base, thence tapering to a sub-obtuse apex, channelled down the face, flat or slightly concave on the face, keeled on the back, strongly recurved; all when young minutely papulose, with those on the margins and keel acute and tooth-like, which dry up and disappear with age; grass-green. Flowers and fruits unknown.

Mesembryanthemum cognatum, N. E. Br. in Journ. Linn. Soc. Bot., Vol. XLV, p. 113, t. 7, Figs. 21-22. *Conophyllum cognatum*, Schwant., in Zeitsch. f. Sukkulent, 1928, p. 32.

Little Namaqualand: Upper slopes of hills south-west of Chubiessis; Pearson, 6, 179.

The figure represents a rooted branch of the type of a state of rest.

7.-- *M. clivorum*, Schwant., in Zeitschr. f. Sukkulent, 1926, p. 182.-- A shrublet 10-12 inches high. Stems and branches 3-7 lines thick, with internodes 5-13 lines long; and constricted at the nodes, glabrous, at first green or reddish-brown, becoming pale grey with age. United pairs of leaves forming cylindric bodies 6-14 lines long, similar to and continuous with the stems, ending in a pair of horizontally spreading or recurving leafy tips 1-2 inches long and 2-3 lines broad at the base; the free leaves 1-2 inches long, 3-5 lines broad and 3-4 lines thick at the base, thence tapering to a sub-obtuse point, slightly concave above, obtusely keeled beneath; all when young covered with minute, glittering, watery papulae, those on the keel and edges larger than the rest and obtuse (not pointed), of a rather dark, dull green. Flowers unknown.

Mesembryanthemum clivorum, N. E. Br. in Journ. Linn. Soc., Vol. XLV, p. 113, t. 5, Figs. 5-8. *Conophyllum clivorum*, Schwant., in Zeitschr. f. Sukk., 1928, p. 322.

Little Namaqualand: Mountain slopes between Stinkfontein Plateau and Chubiessis; Pearson, 6, 200.

This species is somewhat like *M. cognatum*, but more lax in habit, and with a constriction at each node, that is quite wanting in *M. cognatum*.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 86: 264. 1929.

(Continued from page 249.)

MITROPHYLLUM, Schwant.

64 8.-- *M. nanum*, N. E. Br.-- Plant dwarf and tufted, less than

264 an inch high. When at rest the flowering growths are covered below with 2-4 coriaceous, blackish sheaths, that are often oblique and longitudinally rugose. Growths, when at rest, half-moon-shaped, 2-2½ lines broad and 1-1½ line thick, length not stated. Three pairs of leaves sub-clavate; the second pair united to their tips. Flowers sessile. Calyx 6-lobed, with the ovary-part globosely pear-shaped. Petals white, only a very old flower examined. Stigma 6, twisted together, nearly 3½ lines long. Ovary slightly depressed at the centre on the top. Capsule 3½-4½ lines in diameter; valves blackish within; expanding keels sub-triangular, adpressed and flattened, with toothed edges and broad marginal wings; cells roofed with cell-wings. Seeds ½ line long, globosely obovate, pallid.

Conophyllum nanum, L. Bol., Notes on Mesemb., Vol. II, p. 51.

Clanwilliam Division: Between Twenty-four Rivers and Porterville, on clayey soil. Leopoldt.

I have not seen this plant, but it seems to be closely allied to one that Dr. Fischer has described or is about to describe, under the name of *M. Schickianum*, Tisch., which is a stemless species about 1½ inch high, with the cone-leaves about 5 lines thick, tipped with leaf-points 5-6 lines long.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 87: 13. 1930.

(Continued from page 264, Vol. LXXXVI.)

- 13 Since the publication in The Gardeners' Chronicle, 1925, Vol. LXXVIII, p. 412 and 433, of the provisional key to the genera into which I had divided the old genus *Mesembryanthemum*, errors in it have been discovered which I wish here to rectify. For, as might be expected, in constructing for the first time a key to such a very complicated group of plants as this is, it would be scarcely possible to avoid errors, especially as the material available for the purpose was often incomplete. Most, however, are but trivial mistakes that do not affect the general accuracy of the key, but there are two that require explanation. They were not discovered until long after the key was published, and I had not intended to correct them until dealing with the genera concerned, but as one has been much exploited by other writers, it
- 14 is deemed better to correct them now and explain how they were made. One error concerns:--

Mesembryanthemum, Linn. (emended).

When I emended the genus *Mesembryanthemum*, as detailed in The Gardeners' Chronicle, Vol. LXXVIII, p. 232, I selected, on the usual logical principle as there stated, *M. umbellatum*, Linn., as the type of the reformed genus, and explained why. Yet it most unfortunately happens that the structural characters belonging to that species and its allies are not included in the published key, but only those belonging to other species that I had associated with it, although its own characters were also set down in my original key. This error of omission was certainly made during the copying of one of the earlier of the many keys constructed, because it appears in Phillips' Genera of S. African Flowering Plants, and the MSS. for that work I sent to South Africa either in 1914 or early in 1925, months before the key in The Gardeners' Chronicle was published. As the MSS.

14 for Dr. Phillips' book was urgently requested, it was prepared as rapidly as possible, and in the hurry of doing this, that part of my key containing the characters of the typical species of the genus *Mesembryanthemum* was, by some oversight, omitted from both key and description, and only the characters of the species I had then associated with the typical species were included. For in my earlier keys the genus *Mesembryanthemum* was entered in two places: (1) in the group of genera having a placental tubercle in each cell of the fruit and (2) in the group having no placental tubercles. It was the entry under the first group that by mischance was omitted from the key and descriptions sent to Dr. Phillips, and as that key was made the basis of all the subsequent keys, which were copied and re-copied as new genera were added, the error was not noticed until long afterwards.

However, it follows from my statement that *M. umbellatum*, Linn. (an old and correctly understood species) was to be taken as the type of the reformed genus, and must be retained as such, for it would be obvious to any botanist that some mistake has been made, which could easily have been corrected to conform with and include the type by the addition of the italicised words to the description, noted hereafter, or for them to be included in the key, as they were in with or without membranous wings on their outer margin," and "with or without tubercles at the openings to the cells."

I find, however, that Dr. Schwantes has either overlooked that statement or ignored it without inquiry, because, instead of correcting, he has founded his genus *Ruschia* upon the identical type of structure possessed by *M. umbellatum*, Linn., and has selected another species to be the type of *Mesembryanthemum*.

This attempt (in consequence of an obvious error) to replace the genus *Mesembryanthemum*, Linn., as amended by myself, by another generic name of his own not only does not conform with the code of honour held among scientific workers, but is contrary to all rule and precedent, and the science of botany would soon become very chaotic if proposed types of genera that have been examined by authors were allowed to be changed in this way at the will of every writer.

Schwantes is right, however, in separating from *Mesembryanthemum* as distinct genera some of the groups I associated with it at the time of revision of the genus.

The association of the groups alluded to was made because I found that while fruit characters are generally constant for each pronounced vegetative type, yet in some cases they vary very considerably among species that unquestionably belong to one genus. The most remarkable case of variation noted is in the group separated by Schwantes to form the genus *Diosanthemum*, wherein there are species in which the expanding-keels of the fruit are contiguous into a central keel, others in which they diverge; some with well-developed cell-wings, others in which they are rudimentary; some in which a placental tubercle is present some large or small or double, other in which it is absent; some with long, others with short stigmas. I will also mention that in *Dischyma australe* the placental tubercle is present in some specimens and absent from others.

It was this variation that caused me to place under *Mesembryanthemum* the plants Schwantes has separated from it, and for which I had originally provided by placing that genus in two parts of my key. But I agree with Schwantes that some should be separated. For having again examined all available material, I now note that with

14 very few exceptions the above mentioned variation seems to be chiefly confined to the plants forming the genus *Drosanthemum*, and among them may possibly be due to hybridisation, and that among the many hundreds of fruit-capsules examined the presence or absence of a marginal wing or flap to the expanding-keels does not seem to vary among plants having the same vegetative type, and is therefore a more important and trustworthy character than the absence or presence of cell-wings or a placental tubercle. Therefore, it is evident that taken alone and unaccompanied by some floral or very definite vegetative character, the full development or rudimentary nature of the cell-wings, or the presence or absence of a placental tubercle, cannot always be regarded as of generic importance. If, however, consistently accompanied by a floral or very pronounced vegetative character, then I consider that they should rank as of generic value. Because, in a vast and very complex group such as this is, where the affinities of species are often very indefinite, it is of the first importance to the botanist to have some definite structural character or characters whereby the generic affinity of a plant may with certainty be recognised, and as during the very elaborate examination I have made it has been noticed that whenever the vegetative characters are of a very pronounced type, they are usually accompanied by some difference in floral or fruit structure, great prominence is therefore given to vegetative characters for the purpose of distinguishing the genera in the key to them hereafter to follow.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 87: 32. 1930.

(Continued from page 14.)

32 I do not agree with Schwantes, however, in founding genera upon vegetative characters alone, as in the case of *Eberlanzia*, which is identical with *Mesembryanthemum* in fruit and floral characters, merely differing in being spiny, and one species (*M. triticiforme*, L. Bol.) is spiny or spineless. And *Oscularia*, *Echinus*, *Trichodroma* and *Drosanthemum*, which all differ from *Mesembryanthemum* by the presence of marginal wings to the expanding keels, as well as in vegetative characters, have scarcely any structural characters that can be set down in words to distinguish them for one another, on account of the same characters being represented in the variable genus *Drosanthemum*, but as their vegetative characters are so strikingly distinct from each other and from the vegetative characters of other genera, I think it of more convenience to retain them as four genera than as four sections of one genus, and therefore propose to retain and characterise them. But *Ruschia*, even if limited to the type species *R. runcicola*, Schwant. (*M. runcicolum*, Engl.) and its allies, only differs from *Mesembryanthemum* by having a tooth or teeth on the keel of the leaves, for there is no structural difference in either flowers or fruits, while in the remainder of the species placed under *Ruschia* in the foliage is not toothed, although variable in form, and leaf-characters alone, without some structural difference, are admittedly invalid for generic separation. Of vegetative variation in the same genus we have good examples in *Crassula*, *Acacia*, *Euphorbia* and *Veronica*, where it is more diverse

32 then in *Mesembryanthemum* in the restricted sense adopted. I therefore refer all species described under *Ruschia* that have not already been also placed under *Mesembryanthemum* to the latter genus in the list that follows, in which I have been obliged to change several of the specific names, because the name given under *Ruschia* has also been previously used under *Mesembryanthemum*:--

- R. acuminata*, L. Bol. = *M. exacutum*, N. E. Br.
- R. ampliata*, L. Bol. = *M. ampliatum*, N. E. Br.
- R. androsacea*, Marl. and Schwant. = *M. androsaceum*, N. E. Br.
- R. armata*, L. Bol. = *M. armatum*, N. E. Br.
- R. atrata*, L. Bol. = *M. atratum*, N. E. Br.
- R. Barnardii*, L. Bol. = *M. Barnardii*, N. E. Br.
- R. bicolorata*, L. Bol. = *M. bicoloratum*, N. E. Br.
- R. Bijliae*, L. Bol. = *M. Biljiae*, N. E. Br.
- R. brevipes*, L. Bol. = *M. firmum*, N. E. Br.
- R. Britteniae*, L. Bol. = *M. iteratum*, N. E. Br.
- R. calycina*, L. Bol. = *M. separatum*, N. E. Br.
- R. cleista*, L. Bol. = *M. cleistum*, N. E. Br.
- R. Comptonii*, L. Bol. = *M. roseatum*, N. E. Br.
- R. concava*, L. Bol. = *M. ciliolatum*, N. E. Br.
- R. concinna*, L. Bol. = *M. comptum*, N. E. Br.
- R. connata*, L. Bol. = *M. connatum*, N. E. Br.
- R. crassuloides*, L. Bol. = *M. crassulifolium*, N. E. Br.
- R. cymbifolia*, L. Bol. = *M. deceptum*, N. E. Br.
- R. decumbens*, L. Bol. = *M. deflectum*, N. E. Br.
- R. decurrens*, L. Bol. = *M. decurrens*, N. E. Br.
- R. Dejagerae*, L. Bol. = *M. Dejagerae*, N. E. Br.
- R. diversifolia*, L. Bol. = *M. variifolium*, N. E. Br.
- R. Dyeri*, L. Bol. = *M. Dyeri*, N. E. Br.
- R. elineata*, L. Bol. = *M. elineatum*, N. E. Br.
- R. Fergusoniae*, L. Bol. = *M. Fergusoniae*, N. E. Br.
- R. filipetala*, L. Bol. = *M. filipetalum*, N. E. Br.
- R. Fourcadei*, L. Bol. = *M. Fourcadei*, N. E. Br.
- R. Framesii*, L. Bol. = *M. Framesii*, N. E. Br.
- R. gemina*, L. Bol. = *M. geminum*, N. E. Br.
- R. glauca*, L. Bol. = *M. valens*, N. E. Br.
- R. Goodiae*, L. Bol. = *M. Goodiae*, N. E. Br.
- R. gracilis*, L. Bol. = *M. exile*, N. E. Br.
- R. hamatilis*, L. Bol. = *M. hamatile*, N. E. Br.
- R. Herrei*, Schwant. = *M. Herrei*, N. E. Br.
- R. hexamera*, L. Bol. = *M. hexamerum*, N. E. Br.
- R. Hutchinsonii*, L. Bol. = *M. Hutchinsoni*, N. E. Br.
- R. inclusa*, L. Bol. = *M. amplexum*, N. E. Br.
- R. inconspicua*, L. Bol. = *M. latens*, N. E. Br.
- R. incurvata*, L. Bol. = *M. incurvatum*, N. E. Br.
- R. insidens*, L. Bol. = *M. insidens*, N. E. Br.
- R. laxipetala*, L. Bol. = *M. laxipetalum*, N. E. Br.
- R. Leipoldtii*, L. Bol. = *M. Leipoldtii*, N. E. Br.
- R. longipes*, L. Bol. = *M. longipes*, N. E. Br.
- R. lutea*, L. Bol. = *M. flavens*, N. E. Br.
- R. maleolens*, L. Bol. = *M. maleolens*, N. E. Br.
- R. Maxwellii*, L. Bol. = *M. Maxwellii*, N. E. Br.
- R. Meyeri*, Schwant. = *M. Meyeri*, N. E. Br.
- R. micropetala*, L. Bol. = *M. micropetalum*, N. E. Br.
- R. molle*, Schwant. = *M. lene*, N. E. Br.
- R. muricata*, L. Bol. = *M. pellanum*, N. E. Br.
- R. mutica*, L. Bol. = *M. muticum*, N. E. Br.

- R. namaquana*, L. Bol. = *M. namaquanum*, N. E. Br.
R. nana, L. Bol. = *M. reductum*, N. E. Br.
R. nivea, L. Bol. = *M. niveum*, N. E. Br.
R. obtusa, L. Bol. = *M. hebes*, N. E. Br.
R. papillata, L. Bol. = *M. papillatum*, N. E. Br.
R. parvibracteata, L. Bol. = *M. parvibracteatum*, N. E. Br.
R. patens, L. Bol. = *M. displosum*, N. E. Br.
R. Peersii, L. Bol. = *M. formosulum*, N. E. Br.
R. perforata, L. Bol. = *M. perforatum*, N. E. Br.
R. phyllicoides, L. Boll. = *M. phyllicoides*, N. E. Br.
R. Pillansii, L. Bol. = *M. floriferum*, N. E. Br.
R. piscodora, L. Bol. = *M. piscodorum*, N. E. Br.
R. promontorii, L. Bol. = *M. pensifolium*, N. E. Br.
R. prostrata, L. Bol. = *M. prostratum*, N. E. Br.
R. pumila, L. Bol. = *M. pumilum*, N. E. Br.
R. pusilla, Schwant. = *M. parvum*, N. E. Br.
R. radicans, L. Bol. = *M. M. pronum*, N. E. Br.
R. rigida, L. Bol. = *M. albicuta*, N. E. Br.
R. saturata, L. Bol. = *M. atrocinctum*, N. E. Br.
R. saxicola, L. Bol. = *M. saxiculum*, N. E. Br.
R. Schlechteri, Schwant. = *M. Schlechteri*, N. E. Br.
R. senaria, L. Bol. = *M. senarium*, N. E. Br.
R. staminodiosa, L. Bol. = *M. staminodiosum*, N. E. Br.
R. stellata, L. Bol. = *M. stellans*, N. E. Br.
R. stricta, L. Bol. = *M. sublunatum*, N. E. Br.
R. stylosa, L. Bol. = *M. styliferum*, N. E. Br.
R. subglobosa, L. Bol. = *M. reductum*, N. E. Br.
R. succulenta, L. Bol. = *M. succulentum*, N. E. Br.
R. translucens, L. Bol. = *M. translucens*, N. E. Br.
R. triflora, L. Bol. = *M. triflorum*, N. E. Br.
R. triquetra, L. Bol. = *M. triquetrum*, N. E. Br.
R. tuberculosa, L. Bol. = *M. enormis*, N. E. Br.
R. velutina, L. Bol. = *M. lacunatum*, N. E. Br.
R. verruculosa, L. Bol. = *M. verruculosum*, N. E. Br.
R. versicolor, L. Bol. = *M. verruculosum*, N. E. Br.
R. virens, L. Bol. = *M. dumosum*, N. E. Br.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 87: 71. 1930.

(Continued from page 33.)

The other important error concerns:--

Thyrasperma, N. E. Br. and *Hymenogyne*, Haw.

Under paragraph "4" of the key, I described these as having the fruit "1-celled, seeds large, flat and broadly winged all round, arranged in a single whorl around the central axis." This exactly describes the structure as it appeared to me, and as I believe it would appear to everyone who had only dried ripe fruit for examination. Haworth, however, who described from living plants, states that the ovary is "about 12-celled, but the fruit is 1-celled," and described the seeds as winged. Bolus, who also had living material, figured the plant in Hooker's *Icones Plantarum*, t. 1, 995, as

71 having the ovary 10-celled, with two ovules in each cell, but does not figure the seeds. Now, stranger as it may seem, I have since discovered that all this is quite wrong, and we all have been mistaken. Because I have found that the ovary appears to be composed of a solid mass of cellular tissue with many small cells immersed in it and arranged in pairs in a circle, each filled with one ovule. This tissue, which looks so solid and uniform, is really composed of many carpels fused together into a mass, and in the process of ripening the carpels separate from one another, and the tissue composing them dries up and forms a broad, reticulated wing around each seed. So that, when ripe, the separate carpels, each tightly enclosing one seed, have all the appearance of a whorl of winged seeds around a central axis, as described in the key. Therefore, if the above quoted paragraph in the key is altered to read -- "Fruit apparently one-celled; apparent seeds (really 1-seeded carpels) large, flat and broadly winged all around, arranged in a single whorl around the central axis," it will be correct. As this seems to be a very interesting and unique type of structure, it is remarkable that South African botanists have not discovered its true nature long ago. In Europe such a structure would have received much attention.

Key to the Genera.

Restricting Mesembryanthemum to species having the same type of floral and fruit-structure as that possessed by *M. umbellatum*, Linn., the following key defines the characters of that genus and some other genera that have been or are now proposed for species previously considered as vegetative groups of one genus with a variable fruit structure, or of which the fruit was then unknown to me. With the exception of some species of Mesembryanthemum, Trichodiadema and Mitrophyllum, all are plants having distinct, elongated internodes between their leaf-pairs on the primary branches; and their placentas are on the floor or outer wall of the cells in all the genera here mentioned.

1. Leaves of two kinds, all opposite; those on the plant when at rest, or the lowest of the two pairs on a growth dissimilar from others produced when in active growth or from the next pair developed; flowers solitary, pedicellate or sessile; stamens erect. 2

Leaves all similar at all times, all opposite; flowers cymose or solitary, usually pedicellate, but occasionally sessile; stamens erect. 6

2. One pair of leaves when in active growth free to the base, followed by a pair united into a cone or cylinder for half or more than half of their entire length, with spreading tips; internodes of stem evident or none, not bead-like; stamens collected into a column; stigmas, valves and cells of the fruit 5-7; expanding-keels of fruit broad and flat, with marginal wings; cells with or without membranous cell-wings; placental tubercle none. (Type. *M. grande*, N. E. Br.). Mitrophyllum.

One pair of leaves small and closed together at first in ellipsoid or globose form and with or without short, free

tips, followed by a pair of longer, sub-cylindric or semi-cylindric leaves united and often swollen at the base.

Leaf-pairs of small, sometimes not very dissimilar and, when dormant, closed together or enclosed in an entire or frayed and withered skin, or united for part or nearly all of their length, with or without longer free tips; plants tufted, or with railing or matted, elongated stems; leaves sometimes minutely ciliate; stigmas usually 5; expanding-keels diverging from their base, wingless; cells roofed with cell-wings and with a placental tubercle, which is sometimes very small. (Type of genus, *M. umbellatum*, Linn., but to this group of the genus belong *M. pulchellum*, Haw., *M. pygmaeum*, Haw., and *M. evolutum*, N. E. Br.). *Mesembryanthemum*.

3. Stems erect, with bead-like joints or internodes 3-7 lines thick; stigmas, 6-7; expanding keels of fruit broad and flattish, with marginal wings, and with the inner edges raised; cells roofed with cell-wings; placental tubercle none. (Type *M. moniliformis*, Schwant.). *Monilaria*.

Stems slender, not more and usually less than 2 lines thick, terete, not at all bead-like.

4. Leaves and all green parts minutely papulose.

Leaves smooth, dotted, not papulose; stamens collected into a cone, concealing the stigmas and surrounded by 2-3 series of staminodes; stigmas 10, erect, subulate; ovary flattish at the top; expanding-keels of the fruit diverging, winged; cells roofed with cell-wings and with a placental tubercle. (Type *V. angustipetala*, N. E. Br.). *Vanzijlia*.

5. Very dwarf shrublets 3-6 inches high, with erect or ascending branchlets; stamens erect, apparently concealing the 4-7 minute, subulate stigmas; ovary flattish or slightly convex on the top; expanding-keels of fruit contiguous or parallel, with marginal wings; cells roofed with cell-wings; placental tubercle none. (Type *D. Pearsoni*, N. E. Br.). *Dicrocaulon*.

Main stems more or less prostrate, with short, ascending branchlets; stamens erect in a ring around and exposing the 5 radiating, plumose stigmas; ovary much depressed, crater-like at the top; expanding-keels of fruit widely diverging, winged at the apex; cells roofed with cell-wings; placental tubercle none. (Type, *D. tinctus*, N. E. Br.). = *Mes. tinctum*, L. Bol.). *Depacarpus*.

6. Leaves, all green parts, and often the stems papulose, i.e., the whole leaf-surface densely covered with raised cells, which are like small or minute pimples, or are pointed at one or both ends lengthwise to the leaf; stamens collected into a cone or cylindric mass; stigmas, valves and cells of the fruit usually 5, or occasionally

4 or 6; fruit with winged expanding-keels and the cells with well-developed or rudimentary cell-wings.

Leaves not papulose as seen by the naked eye, but sometimes with raised, scattered dots, more often quite smooth. (Some species of *Mesembryanthemum* I have not seen are described as minutely papillate, but I believe this refers only to a microscopic elevation of the surface-cells not distinctly visible to the naked eye, as in the sense above intended.)

7. Leaves tipped with a tuft of small bristles, and the elevated surface-cells often pointed at one or both ends, sometimes entire; stems papulose or sometimes slightly setose; stigmas shorter than the stamens; fruit with the expanding-keels contiguous and without placental tubercles. (Type, *T. barbatum*, N. E. Br. = *T. stelligerum*, Schwant. = *Mes. barbatum*, Linn.) Trichodiadema.

Leaves without a tuft of bristles at the apex, surface cells entire; stems papulose or with short bristles or hairs upon it; stigmas usually as long as or longer (but sometimes shorter) than the stamens, not plumose; expanding-keels of fruit contiguous, parallel or diverging; placental tubercle usually absent, sometimes present and small and double, rarely large and conspicuous. (Type, *D. hispidum*, Schwant. = *Mes. hispidum*, Linn.)

Drosanthemum.

8. Stigmas, valves and cells of the fruit usually 5, occasionally 4, 6 or 7.

Stigmas, valves and cells of the fruit usually 8-12, occasionally 7; erect shrubs or shrublets.

9. Stamens collected into a cone or compact column free from the petals to their base, concealing the stigmas and often surrounded by 1-3 series of staminodes.

Stamens not collected into a cone or compact column, often more or less lax, usually without, but sometimes with staminodes; stigmas not concealed.

10. Expanding-keels of the fruit with marginal wings and more than half as long as the valves, and the cells without a placental tubercle; stigmas equalling or shorter than the stamens.

Expanding-keels of the fruit without marginal wings and only about half as long as the valves, diverging; cells with a placental tubercle, which is occasionally minute and may sometimes perhaps be absent; usually erect shrubs, shrublets, or decumbent or prostrate plants with well developed internodes, but sometimes very dwarf and tufted, without internodes between the leaf-pairs; flowers cymose or solitary. (Type, *M. umbellatum*, Linn.)

Mesembryanthemum.

11. Leaves toothed on their margins and often on the keel, united only at the base; expanding-keels of the fruit diverging from the base; bushy, branched, dwarf shrubs, glabrous. (Type, *O. deltoides*, Schwant. = *Mes. deltoides*, Linn.). *Oscularia*.

Leaves not toothed, united in pairs for $\frac{1}{2}$ - $\frac{1}{3}$ of their length small shrublets or prostrate plants, glabrous or velvety-puberulous to the touch; fruit with the expanding-keels contiguous or diverging only at the apical part, and with the cell-wings rudimentary or well developed. (Type, *E. edentulus*, N. E. Br. = *Mes. edentulum*, Ham.). *Echinus*.

12. Stigmas more or less exposed to view, stoutly subulate or ovate-subulate or plumose; ovary flattish or convex at the top; expanding-keels of fruit with marginal wings; cells roofed with cell-wings, but without a placental tubercle; erect shrubs, shrublets or prostrate plants; flowers mostly solitary, sometimes three together. (Type, *L. multiradiatus*, N. E. Br. = *Mes. multiradiatum*, Jacq.). *Lamproanthus*.

Stigmas apparently well exposed to view, erect, filiform with the stamens in a ring around them; ovary deeply concave on the tops; expanding-keels closely contiguous throughout and reaching to the tips of the valves, entirely without marginal wings; cells open, without or with rudimentary cell-wings and without a placental tubercle; stems slender, prostrate, with distinct internodes, glabrous; flowers solitary. (Type, *M. intervallis*, N. E. Br. = *Ruschia intervallis*, L. Bol.). *Mossia*.

13. Leaves scarcely or but slightly united at the base, distinct from and not continuous with the stem. 14

Leaves completely united at the base and continuous with the green, fleshy stem, always short and usually less than half-an-inch long. 15

14. Leaves an inch or more long and more than $\frac{1}{2}$ -inch thick, trigonous, the keel often dilated near the apex, obtuse, almost spurred at the base; flowers solitary, two inches or more in diameter; calyx un-equally 4-lobed; outer stamens erect in a ring and the inner crowded together, no staminodes; stigmas 8, short and stoutly subulate; fruit unknown; erect shrub. (Type *E. octonaria*, N. E. Br. = *Mes. octonarium*, L. Bol.). *Enarganthe*.

Leaves not more and usually less than an inch long, and not $\frac{1}{4}$ inch thick; flowers often 3-4 together at the ends of the branches, about an inch or less than an inch in diameter; calyx sub-equally 5-lobed; in stamens erect in a compact cone or column, with or without a few staminodes; stigmas 10-12, subulate; expanding-keels of fruit winged, the cells roofed with cell-wings and with a placental tubercle; erect or decumbent shrublets with

15. Stamens erect and conspicuous, collected into a compact column or cone, surrounded by a few staminodes not longer than themselves; petals not very slender; stamens 7-10; expanding-keels diverging, with rounded edges and with a large or without a terminal awn, wingless; cells roofed with cell-wings and with a large placental tubercle. (Type, *O. octojuge*, N. E. Br. = *Mes. octojuge*, L. Bol.). Octopoma.

Stamens inflexed and more or less concealed by very numerous staminodes much longer than themselves which surround them in 3-4 series and are all inflexed to the centre.

16

16. Petals $\frac{1}{2}$ -line or more broad; stigmas 7-10, very minute; expanding keels of fruit with rounded edges and diverging, acute or awned tips, not winged; cells roofed with cell-wings, but without placental tubercles; leaves short, deltoid-trigonous, hooked at the tips. (Type, *S. viridis*, N. E. Br. = *Mes. viride*, Haw.).

Smicrostigma.

Petals filiform-linear, very slender; stigmas 9-11, filiform-subulate, not minute; expanding-keels of fruit abruptly diverging at the tips, with rounded edges and broad, terminal, membranous wings; cells roofed with cell-wings and with conspicuous placental tubercles; leaves short, trigonous. (Type, *P. Pearsoni*, N. E. Br.). Polymita.

N. E. Brown.

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 78: 126. 1930.

(Continued from page 71)

CIRCANDRA, N. E. Br.

126

Perennial shrub, succulent. Leaves opposite, scarcely united at the base. Flowers solitary, terminal, pedicellate. Calyx unequally 5-lobed down to the top of the ovary. Petals numerous, free, cuneately linear. Stamens numerous, very short, arranged in a ring around the top of the ovary at the base of the inner petals and leaving the top of the ovary fully exposed to view. Stigmas 5, very small radiating. Ovary inferior, concave and with 5 slight sutural ridges on the top. Fruit unknown.

The only species is *C. serrata*, N. E. Br., a native of South Africa.

The name is derived from the Greek, *kirkos*, a ring, and *aner*, male, in allusion to the remarkable manner in which the very short stamens are arranged in a ring around the top of the ovary, clearly exposing the latter to view.

C. serrata, N. E. Br.-- A shrub 1½-2 ft. high,. Branches erect, with internodes 4-16, lines long and 1-1½ line thick, two-

126 edged, at first green, then purplish or violaceous, finally with a greyish bark. Leaves ascending, scarcely united at the base, 9-10 lines long, 1-2 lines thick, trigonous, acute, flat on the face, with sharp edges acutely keeled and the keel serrate on the back, glaucous-green, pellucid-dotted. Pedicel 1-1½ inch long, thickened upwards. Calyx obconic and two-edged below, unequally 5-lobed, the larger lobes serrulate on the back, pellucid-dotted, the smaller with membranous margins dotted with red. Corolla about 2 inches in diameter, opening in bright sunshine, slightly scented; petals in about 3 series, the outer apparently 7-8 lines long and 2-1 line broad, cuneately linear, obtuse or slightly toothed, flat, the inner smaller concave and slightly unturned, all bright yellow. Stamens exceedingly short, in a ring, fully exserting the whole top of the ovary in view; saffron-coloured; other characters as from the genus.

Mesembryanthemum serratum, Linn. *Sp. Pl.*, ed. 1, p. 423 (founded upon *M. serratum flore acetabuliformi luteo*, Dillen. *Hort. Elth.*, p. 249, t. 192), Haw. *Obs.*, p. 381, *Misc. Nat.*, p. 68, *Synon.*, p. 293, and *Rev.*, 131. Figured also in *Fetiver*, *Geophylacium*, Dec. 6, p. 8, t. 78, Fig. 2.

South Africa: Locality and collector unknown. It was first figured by *Fetiver* in 1709 and afterwards by *Dillenius* in 1732, who states that it was sent by his friend J. M. de Brakelsen, but does not say from what locality.

This very distinct plant is only known to me from the type specimen and the *Dillenian* description, from which it is evident that in floral structure it is entirely different from all other known members of the group, and doubtless, when it is rediscovered, its fruit will be found to differ also.

OCTOPOMA, N. E. Br.

Very dwarf, bushily branched, perennial succulents. Branches succulent when young, becoming woody with age, with distinct, short internodes. Leaves opposite, united at the base and often continuous with the stems, short. Flowers terminal 1-7 to a branch, subsessile or on very short pedicels. Calyx unequally 4-5-lobed down to the ovary. Petals numerous, in 2-3 series, free, cuneately linear. Stamens erect, collected into a compact column or cone and sometimes becoming lax, often surrounded by a few staminodes, not longer than themselves; filaments sometimes bearded. Glands in a crenulate ring. Stigmas 7-10, subulate. Ovary inferior, convex at the top, with 7-10 cells; placentas on the outer walls of the cells. Capsule shortly obconic, convex at the top, with slightly raised sutures; valves and cells 7-8; expanding-keels contiguous at the basal half, diverging above and awned or awnless at the tips, without wings; cells roofed with membranous cell-wings and with a placental tubercle.

Species 3, natives of South Africa. The type of the genus is *O. octojuge*, N. E. Br.

The name is derived from the Greek, *okto*, eight, and *poma*, a lid or cover, in allusion to valves of the capsule, which are frequently eight in number.

This genus is allied to *Leipoldtia*, L. Bol., from which it differs by its leaves being completely united at the base and more or less confluent with the stem, and by the expanding-keels of the fruit being contiguous at the basal half and wingless, in *Leipoldtia* they are divergent nearly from the base and are winged at their api-

26 cal part. The pedicels also of *Ocotonoma* are shorter and stouter than those of typical *Leinoldtia*, and apparently two-edged. The habit of the two genera is also different.

Key to the Species.

1. Plant 2-4 inches high; leaves $1\frac{1}{2}$ - $3\frac{1}{2}$ lines long, smooth, glabrous; the larger calyx lobes 5-6 lines long (ex L. Bolus.); expanding-keels of fruit awned at the tips.

1. octojuge

Plant 6-12 inches high; leaves slightly velvety to the touch from being covered with microscopic points.

2

2. Leaves 1-3 lines long, perhaps longer under cultivation, deltoid-ovate, obtuse or rounded at the apex, edges quite toothless; corolla apparently 6-8 lines long (9-12 lines, ex L. Bolus), in diameter; expanding-keels of fruit awned at the apex; internodes of stem mostly 1-21 lines long.

2. inclusum.

Leaves 3-6 lines long, trigonous, sub-obtuse, minutely toothed on the edges; corolla apparently about 12 lines in diameter; expanding-keels of fruit awnless; internodes of stems mostly 6 lines or more long.

3. abruptum

1. *O. octojuge*, N.E.Br.-- A very small, bushy shrublet, 2-4 inches high, much branches. Stems erect, terete, $1\frac{1}{2}$ - $1\frac{1}{2}$ line thick, with internodes 1-6 lines long, glabrous, at first green, then greyish, finally brown. Leaves spreading or ascending-spreading, united at the base for about $1\frac{1}{2}$ line, only 1-2 pairs alive on a branch at the same time, the other withered, $1\frac{1}{2}$ - $3\frac{1}{2}$ lines long, $1\frac{1}{2}$ - $1\frac{1}{2}$ line ($2\frac{1}{2}$ lines ex L. Bolus) broad and $1\frac{1}{2}$ - $1\frac{1}{2}$ line thick, flat on the face, slightly keeled on the back, and convex on the sides, obtuse, the edges and keel at the apical part with a few minute prickly-like points, otherwise smooth, glabrous, rather light green, not at all glaucous, pellucid-dotted, often with young branchlets in their axils. Flowers solitary. Pedicels of fruit 1-3 lines long, partly enclosed in the united bases of the leaves when in flower. Calyx obconic bell-shaped, unequally 4-lobed, the two larger lobes 5-6 lines long, leafy. Corolla about $1\frac{1}{2}$ inch in diameter; petals in 2-3 series, the outer 5-6 lines long, $1\frac{1}{2}$ - $1\frac{1}{2}$ lines broad, the inner shorter. Stamens erect in a cylindric mass surrounded by staminodes 3 lines long; filaments not bearded, white; anthers pale yellow. Capsule $3\frac{1}{2}$ -4 lines in diameter, obconic, expanding-keels diverging above, ending in fine awns that are pressed close upon the valve and scarcely noticeable, dingy honey-brown; cells somewhat acutely roofed with flexible subfuscous cell-wings and with a large, pallid placental tubercle, on each side of which the outer wall is marked with a large dark spot.

Mesembryanthemum octojuge, L. Bol., in Ann. Bot. Herb., Vol. IV, p. 771

Riversdale Division: Klein Karoo, Muir 3,9573, 969.

2. *O. inclusum*, N.E.Br.-- A. rigid, woody shrublet, 6-12 inches high, densely much-branches, the old stems 3- $3\frac{1}{2}$ lines thick, fuscous; internodes of main branches 2-5 lines long and $1\frac{1}{2}$ - $1\frac{1}{2}$ line thick, those on the lateral branchlets often undeveloped and bearing several old and densely crowded leaf-pairs; young branchlets some-

126 what two-edged. Leaves spreading, 1-3 lines long (2-4 lines long ex L. Bolus, and probably under cultivation they would become 4-6 lines long), 2-2½ lines broad and 1-1½ line thick, deltoid ovate, obtuse or rounded at the apex, flat on the face, keeled on the back, somewhat velvety to the touch from being covered with microscopic points, pellucid-dotted, glaucous-green. Flowers 1-3 to a branch, subsessile or on pedicels 1-1½ line long included between the bases of the upper pair of leaves. Calyx shortly obconic below; lobes about 2-2½ lines long, three of them with membranous margins. Corolla 6-7 lines (9-12 lines ex L. Bolus) in diameter, open in day-time; petals in 2 series, obtuse or toothed, 2-3 lines (3 lines ex L. Bolus) long 1/3-½ line ex L. Bolus) broad, magenta-pink. Stamens surrounded by staminodes, at first collected, long afterwards lax, 1½ line (3 lines ex L. Bolus) long; filaments purple above, white below, bearded; anthers whitish. Stigmas 8-10, erect, 1 line (2-2½ lines ex L. Bolus) long. Capsule 2-2½ lines in diameter when closed; with 2-10 valves and cells; valves ochraceous within; expanding-keels contiguous for most of their length with diverging tips, awned at the apex, reddish-brown; cells roofed with membranous cell-wings and with a large, whitish placental tubercle.

M. inclusum, L. Bolus in Ann. Bolus Herb., Vol. IV, p. 40.

Little Namaqualand: slopes south of Sonderkop, Pillans in Bolus Herb. 17,758, Flamink Berg, Walle Kraal, Pillans in Bolus Herb. 17,911.

The leaves are described as scurfy ("lepidota") by Mrs. Bolus, but this is not the case, they are covered with microscopic points, just as in *O. abruptum*, N. E. Br.

3. *O. abruptum*, N. E. Br.-- A rigid, woody shrublet, apparently 6-8 inches high. Branches erect or ascending, with internodes 4-14 lines long and ½-1½ lines thick, compressed and somewhat two-edged and reddish-brown speckled with whitish when young, becoming terete and fuscous with age. Leaves spreading, 3-6 lines long 1½-2½ lines broad and thick, trigonous, subobtusely apiculate, flat on the face, acutely keeled on the back, minutely toothed on the edges and slightly velvety to the touch from being covered with microscopic points, mostly with short, leafy branchlets in both axils. Flowers 1-3 to a branch. Pedicels 2-3 lines long. Calyx-lobes deltoid, subacute, about 2 lines long and as much in breadth. Corolla apparently about an inch in diameter; petals about 4 lines long and ½-line broad. Stamens 1½ line long. Stigmas 7-9, erect, about 1 line long, subulate. Ovary slightly convex at the top. Expanding-keels of fruit contiguous at the basal half, diverging at the tips, without awns or wings; cells roofed with membranous cell-wings and with a small placental tubercle.

Mesembryanthemum abruptum, Berger in Engler, Bot. Jahrb., Vol. LVII, p. 638 (1922).

Clemmatis Division: Brandvlei River, Schlechter 10, N.E.
N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 27: 151. 1930.

(Continued from page 126.)

MOSSIA, N. E. Br.

A prostrate, succulent, perennial herb, with distinct internodes on the main stems. Leaves opposite, united at the base, trigonous-ovate. Flowers solitary, terminal, on very short pedicels or subsessile between the leaves. Calyx produced into a very short tube or cup above its union with the ovary, sub-equally 5-lobed above. Petals arising at the base of the calyx-lobes and above the top of the ovary, in 1-2 series, shorter than the calyx-lobes. Stamens numerous, erect, in a ring around the stigmas no staminodes. Glands forming a shallow cup or bowl on the top of the ovary, with five broad crenations on the margin. Stigmas 5, erect. Ovary inferior, concave at the top, 5-celled. Placentas on the floor of the cells. Capsule small, very shortly and broadly obconic, with five valves and cells; valves closing after expansion; expanding-keels closely contiguous throughout and reaching to the apex of the valves, without marginal wings; cells open or with very rudimentary cell-wings and without a placental tubercle. Seeds ovoid, smooth.

A monotypic genus, of which the type is *M. intervallaris*, N. E. Br.; native of the Transvaal and neighbouring areas.

The name is given to commemorate Professor C. E. Moss, one of the foremost of South African botanists, whose name I have great pleasure in associating with this very distinct plant.

1. *M. intervallaris*, N. E. Br.-- Stems rooting at the nodes, with internodes 3-16 lines long and 1-1 line thick. Leaves 3-5 lines long, 2-3 lines broad and 1-2 lines thick, distant on main stems and crowded into small tufts 5-9 lines long on the very short axillary branchlets, trigonous-ovate, sub-acute, narrowed to the base from about the middle, flat on the face, keel on the back, sometimes entire, but often with 1 or 2 obscure and very blunt teeth or slight angles on the edges and keel near the apex, covered with slightly prominent dots, dull sub-glaucous green. Calyx shortly obconic below, produced about 1-2 line long above the top of the ovary; lobes 2 lines long, 1-1 line broad, oblong, obtuse, the two outer with a compressed keel at the apex. Corolla about half-an-inch in diameter, expanding at night at about 9.30 p.m.; outer petals about 2-3 lines long and 1-2/3 line broad, linear or linear-lanceolate, obtuse or sub-acute, the inner smaller, pale creamy-yellow, almost white. Stamens 1 line long, whitish. Glandular cup on the top of the ovary about 1-line deep. Stigmas 1 line long, subulate, erect. Capsule about 1 line in diameter when expanded, entirely pale honey-coloured within; valves broader than long, otherwise as noted under genus. Seeds 1-line long.

Mesembryanthemum intervallare, L. Bol. in Ann. Bol. Herb., Vol. IV, p. 81. (On p. 71 this name should be substituted for *Ruschia intervallaris*, L. Bol., which was entered by mistake owing to Mrs. Bolus having used the same specific name under both genera).

South Africa: Transvaal; near Johannesburg, Moss 15, 170, 17274, near Alberton, Wood, near Lake Chrissie, Glenkiron in Herb. Moss 16, 565, Herschell Division; Sterkspruit, Herburn.

ENARGANTHE, N. E. Br.

Dwarf, shrubby, succulent perennial, with woody branches and distinct internodes. Leaves opposite, not united at the base, stoutly trigonous, not repulose. Flowers solitary, terminal, subsessile or shortly pedicellate, large and showy. Calyx unequally

151 4-lobes to its union with the ovary. Petals numerous, in about two series, free. Outer stamens erect in a ring, the inner crowded; filaments bearded below; no staminodes. Glands in a crenulate ring. Stigmas 8, short, subulate. Ovary inferior, convex at the top, with 8 cells; placentas on the outer wall. Fruit unknown.

A monotypic genus, of which *E. octonaria*, N. E. Br., is the type; native of Namaqualand.

The name is derived from the Greek, *enarges*, brilliant, and *anthos*, a flower, in allusion to its handsome and brilliantly coloured flowers.

The plant upon which I founded this genus differs from *Mesembryanthemum* by having a 4-lobed calyx, its outer stamens in a ring, and 8 stigmas; the leaves also are quite separate, whereas in *Mesembryanthemum* they are usually more or less united at the base.

1. *E. octonaria*, N. E. Br.-- A dwarf, woody shrublet, 6-8 lines high, bushily branched, glabrous. Young parts of the branches 2-2½ lines thick, succulent, becoming woody with age and reduced to about 1½ line thick, with a greyish bark; internodes 2-12 lines long. Leaves spreading, 12-16 lines long, 3-5 lines broad and about the same in thickness above the middle, clavately trigonous, being thicker and broader above the middle than at the base, obtuse, flat or slightly convex on the face, obtusely keeled on the back, not united at the base and the keel produced into a short spur adnate to the branch, smooth, green, without dark dots. Calyx-lobes stout, the two larger 7-8 lines long and 5 line broad, leafy; the two smaller with membranous margins. Corolla 2-2½ inches in diameter, expanding in the middle, part of the day, and lasting for several days; petals about an inch long and 1½-2 lines broad, cuneately linear, obtuse, of a brilliant rose-purple, with a darker mid-line. Stamens 4-4½ lines long; filaments purple, becoming pallid at the base; anthers purple-brown.

M. octonarium, L. Bol. in Fl. Pl. S. Afr., Vol. VII, t. 271.

Little Namaqualand: Between Doornpoort and Brakfontein, Pillans 5,760.

This is an extremely beautiful shrubby species of very dwarf habit, with very stout leaves.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 87: 186. 1930.

(Continued from page 151.)

SMICROSTIGMA, N. E. Br.

186

A perennial, dwarf, shrubby Succulent. Branches succulent, becoming woody with age, with distinct internodes. Leaves opposite, united at the base and continuous with the stem, small, deltoid-trigonous. Flowers solitary, terminal, subsessile or very shortly pedicellate. Calyx unequally 5-lobed down to the ovary. Petals numerous, free, in about 3 series, cuneately linear, horizontally spreading. Staminodes very numerous, in 3-4 series, filiform, all inflexed and partly concealing the stamens, bearded

186 below, recurved at the tips. Stamens in several superposed series, short, all inflexed; filaments bearded. Stigmas 7-10, very short or minute. Ovary inferior, flattish on the top, with 7-10 cells; placentas on the outer wall of the cells. Capsule obconic, slightly convex, with 7-10 prominent sutures at the top (which is not cushion-shaped as represented by Mrs. Bolus's figure); valves horizontal when expanded and closing after expansion; expanding-keels with rounded edges, contiguous at the basal part with diverging, acute or awned tips, without marginal wings; cells roofed with flexible cell-wings, without a placental tubercle. Seeds compressed-ovoid, with a short point, minutely tuberculate.

A monotypic genus, native of South Africa. The type is *S. viride*, N. E. Br.

The name is derived from the Greek, *smikros*, short, and *stigma*, a point, an allusion to the very short stigmas.

This genus is allied to *Polymita* in vegetative and floral characters, but differs by the expanding-keels of the fruit being without membranous wings and by the cells being without a placental tubercle at the opening. From *Erepsia*, to which genus the species has been referred, it differs in vegetative characters and in having 7-10 stigmas and fruit-valves, and the expanding-keels of the fruit contiguous at their lower half.

1. *S. viride*, N. E. Br.-- A shrublet 6-12 inches high, glabrous. Branches ascending, with internodes 3-3 lines long and about 3 lines thick when young and fleshy, tapering downwards, becoming more slender and woody with age. Leaves 2-4 lines long and $1\frac{1}{2}$ -2 lines broad at the base, deltoid-trigonous, with acute, recurved tips, flat on the face, obtusely keeled on the back, smooth and greyish-green like the young stems, with red edges, not marked with dark dots. Calyx with the two longer lobes 2-4 lines long, leaf-like. Corolla 8-10 lines in diameter; petals in about 2-3 series, 2-3 $\frac{1}{2}$ lines long, and $\frac{1}{2}$ -1 line broad, cuneately linear, obtuse, minutely repulose at the base, dull rosy-purple. Staminalodes dull rose-purple, bearded at the lower part. Stamens with bearded at the lower part. Stamens with bearded, white filaments and yellow anthers. Stigmas usually 8-10, sometimes 7, subulate, $\frac{1}{2}$ -2/3 line long. Capsule about 4 lines in diameter when closed, brown within when expanded.

Mesembryanthemum viride, Haw. Obs. p. 314, Misc. Nat., p. 93, Syn. p. 292, and Rev. p. 126; Salm Dyck, Mes. 33, f. 2; Berger, Mes. und Fort., p. 106. *M. integrum*. L. Bol. in Ann. Bol. Herb., Vol. III, p. 34. *Euschia integra*, Schwant. in Zeitschr. f. Sukk., 1926, p. 187. *Erepsia viridis*, L. Bol. in Fl. Pl. S. Afr., Vol. VII, t. 270.

Montagu Division: Near Montagu Bath., Bolus 6,714. Concor-
dia Valley, Cook, Roberson Division: Ashton, Rogers in Bolus
Herb. 17,175. Riversdale Division: Little Karoo. Muir 2,765,
4,278.

As in the genus *Erepsia*, the flowers, after they once have expanded, do not close again. Dr. J. Muir states of it in a note:-- "The flowers open in the forenoon and remain open day and night permanently. On the first day they attain 3 $\frac{1}{2}$ lines in diameter, which is full size, purplish-pink or rose-purple, some pale pink. Flowering from October to February."

Under t. 270, Fl. Pl. S. Afr., Vol. VII, published in 1927, Mrs. Bolus remarks:-- "The only collection I could find, in searching through the large European Herbaria, which closely resembled

186 our present species (and in a less degree *M. karooicum*, L. Bolus) was *M. campestre*, Burchell (No. 1,340), of which there are two specimens without flowers, but with fruit, in the Kew Herbarium." This statement scarcely agrees with the facts, because when Mrs. Bolus was at Kew in 1925, she found three dried specimens in the Kew Herbarium that were all named by myself, "*M. viride*, Haw."; two of them I gathered and named from cultivated plants respectively in 1887 and 1880, and another (Bolus, 6,714) was distributed from the Bolus Herbarium as "*M. cfr. uncinellum*, Haw." These three specimens have all been labelled by Mrs. Bolus "*M. integrum*," and dated "25-8-25."

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 87: 211. 1930.
(Continued from page 186.)

ANTIMIMA, N. E. Br.

11 Very dwarf, succulent, perennial, glabrous, forming clumps of very short, erect branches, with one pair (or when making new growth two pairs) of leaves to each. Leaves united at the base, ascending-spreading, thick and fleshy, ovate-lanceolate, smooth, whitish-green. Flowers green. Flowers solitary, terminal, sessile, bi-bracteate. Calyx sub-equally 5-lobed down to its union with the ovary. Petals free, in about two series. Stamens numerous, erect, in a ring around the large stigmas; filaments not bearded. Stigmas 5, large, stoutly lanceolate-subulate, acuminate. Ovary inferior, flat on the top, 5-celled; placentas on the outer wall. Fruit not seen, but stated to be like that of *Mesembryanthemum*.

A monotypic genus, of which the type is *A. dualis*, N. E. Br. A native of South Africa.

The name is derived from the Greek, *antimimos* = imitating, in allusion to the resemblance this plant has to *Argyrodendron neesianum*.

1. *A. dualis*, N. E. Br. (Fig. 88).-- Plant forming clumps 1-2 inches high, formed of rather closely packed stems covered with the crowded remains of dead leaves which form four very distinct and acute angles, glabrous in all parts. Leaves 7-10 lines long, 4-5 lines broad and 3-3½ lines thick at the base, thence gradually tapering to a sub-acute and shortly apiculate apex, slightly convex on the face, obtusely-keeled on the back, with the edges and the keel over the apex cartilaginous, smooth, entirely whitish-green. Flower sessile, with a pair of bracts under the calyx, which is somewhat Pear-shaped and 3½ lines in diameter, smooth; lobes 2½-2¾ lines long, ovate, obtuse, with narrow, membranous edges. Corolla about ¼-inch in diameter, but perhaps not fully developed in the specimen seen; petals in about 2 series, 3-3½ lines long, 1/3-line broad, linear, obtuse, bright rose-~~white~~. Stamens about 2 lines long; filaments not bearded, white; anthers pale yellow. Stigmas erect, 2 lines long and 2/3-line broad, as long as the stamens, but probably not fully developed, stoutly lanceolate-subulate, acuminate, pale yellowish.

Mesembryanthemum duale, N. E. Br., in Journ. Linn. Soc. Bot., XIV, 29. *Argyrodendron duale*, N. E. Br. in Gard. Chron., 1922, III,

211 105, and 1926, LXXXI, 267; Jour. Bot., 1928, 265. *Ruscus aculeatus*, L. Bol. in Notes II, 104.

Van Rhynsdorp Division: Ridges near Bakhuis, Pearson and Pillans 5,483.

This interesting plant was sent to Kew in 1911 by Professor Pearson and portions of it were given to myself and to Dr. Rodier Keath, and now, after eighteen years, it has flowered for the first time under cultivation in this country with Dr. Rodier Keath, who has very kindly loaned to me his plant to describe and figure. But Fig. 22 represents only one growth of the plant. It so much resembles *Argyrodernis neocanum*, N. E. Br. that (its flowers being then unknown) I placed it under that genus. But now that it has flowered its structure proves to be so entirely different from that of *Argyrodernis* that it must be placed in a separate genus. It differs from *Argyrodernis* by its calyx being lobed down to its union with the ovary and by having 5 large stigmas and 5 cells in the ovary, instead of one sessile, circular stigma and many cells in the ovary.

This is another instance of the curious vein of mimetic resemblance that pervades the whole of the flowering plants. This plant is so like *Argyrodernis* in appearance, that without examining its flowers no one would hesitate to place it in that genus. There are also several other members of this family whose vegetative characters are quite the same as those of other genera, and we have in the genus *Veronica* some New Zealand species that resemble a *Lycopodium*, in *Viola* a Chilean species that resembles a *Saxifraga* and numerous other instances which it would appear that there is latent in plants some element that controls the form the vegetative organs shall assume or which may indicate some near or very remote relationship to other and widely different plants. And that when this dormant element asserts itself it causes the plant to assume the appearance of the ancestor from which it was derived. I can think of no other way to account for the very numerous cases of mimetic resemblance that occur among flowering plants, if it be not the possession of some latent element that now and then breaks out, assumes control and reverts to an ancestral type. The cause of such an outbreak may, of course, be induced by external factors.

LALPRANTHUS, N. E. Br.

As it will take some weeks to work out and describe it in detail all the species of this beautiful genus, which I recently separated from *Mesembryanthemum*, I here give a list of the species that appear to belong to it. Some of the, however, I have not seen, and as the descriptions are incomplete, they may not really belong here, although from the description I judge this to be their right genus. Some also may possibly prove to be synonyms of others. In the synonymy the letter M. stand for *Mesembryanthemum*.

- L. acutifolius*, N. E. Br. (*M. acutifolium*, L. Bol.).
- L. aduncus*, N. E. Br. (*M. aduncum*, Haw.).
- L. altistylus*, N. E. Br. (*M. longistylum*, L. Bol., not of De Candolle).
- L. amoenus*, N. E. Br. (*M. amoenum*, Salm Dyck).
- L. aureus*, N. E. Br. (*M. aureum*, Linn.).
- L. bicolor*, N. E. Br. (*M. bicolor*, Linn.).
- L. brachyandrus*, N. E. Br. (*M. brachyandrum*, L. Bol.).
- L. Brownii*, N. E. Br. (*M. Brownii*, Hook.f.).
- L. caespitosus*, N. E. Br. (*M. caespitosum*, L. Bol.).

- L. calcaratus*, N. E. Br. (*M. calcaratum*, W. Dod.).
L. capillaceus, N. E. Br. (*M. capillaceum*, L. Bol.).
L. coccineus, N. E. Br. (*M. coccineum*, Haw.).
L. Comptonii, N. E. Br. (*M. Comptonii*, L. Bol.).
L. conspicuus, N. E. Br. (*M. conspicuum*, Haw., not of Salm Dyck or Berger).
L. coralliflorus, N. E. Br. (*M. coralliflorum*, Salm Dyck.).
L. curvifolius, N. E. Br. (*M. curvifolium*, Haw.).
L. cyathiformis, N. E. Br. (*M. cyathiforme*, L. Bol.).
L. debilis, N. E. Br. (*M. debile*, Haw.).
L. deflexus, N. E. Br. (*M. deflexum*, Ait.).
L. diffusus, N. E. Br. (*M. diffusum*, L. Bol.).
L. dilutus, N. E. Br. (*M. pallidum*, L. Bol., not of N. E. Br.).
L. disgregus, N. E. Br. (*M. stipulaceum*, L. Bol., not of Linn.).
L. diutinus, N. E. Br. (*M. diutinum*, L. Bol.).
L. Dregeanus, N. E. Br. (*M. Dregeanum*, Sond.).
L. drepanophyllus, N. E. Br. (*M. drepanophyllum*, Berger).
L. Dyckii, N. E. Br. (*M. Dyckii*, Berger, *M. conspicuum*, Salm Dyck and Berger).
L. emarginatoides, N. E. Br. (*M. emarginatoides*, Haw.).
L. emarginatus, N. E. Br. (*M. emarginatum*, Linn.).
L. erratus, N. E. Br. (*M. virens*, Salm Dyck, not of Haw.).
L. explanatus, N. E. Br. (*M. explanatum*, L. Bol.).
L. falcatus, N. E. Br. (*M. falcatum*, Linn.).
L. falciformis, N. E. Br. (*M. falciforme*, Haw.).
L. filicaulis, N. E. Br. (*M. filicaule*, Haw.).
L. flexifolius, N. E. Br. (*M. flexifolium*, Haw.).
L. flexilis, N. E. Br. (*M. flexile*, Haw.).
L. formosus, N. E. Br. (*M. formosum*, Haw.).
L. Framesii, N. E. Br. (*M. Framesii*, L. Bol.).
L. furvus, N. E. Br. (*M. furvum*, L. Bol.).
L. glaucoides, N. E. Br. (*M. glaucoides*, Haw.).
L. glaucus, N. E. Br. (*M. glaucum*, Linn.).
L. glomeratus, N. E. Br. (*M. glomeratum*, Linn.).
L. gracilipes, N. E. Br. (*M. gracilipes*, L. Bol.).
L. Guthriæ, N. E. Br. (*M. Guthriæ*, L. Bol.).
L. Haworthii, N. E. Br. (*M. Haworthii*, Don.).
L. Henricii, N. E. Br. (*M. Henricii*, L. Bol.).
L. imbricans, N. E. Br. (*M. imbricans*, Haw.).
L. Immelmaniæ, N. E. Br. (*M. Immelmaniæ*, L. Bol.).
L. inaequalis, N. E. Br. (*M. inaequale*, Haw.).
L. laxifolius, N. E. Br. (*M. laxifolium*, L. Bol.).
L. leptaleon, N. E. Br. (*M. leptaleon*, Haw.).
L. Lerouxiae, N. E. Br. (*M. Lerouxiae*, L. Bol.).
L. longistamineus, N. E. Br. (*M. longistamineum*, L. Bol.).
L. lunatus, N. E. Br. (*M. lunatum*, Willd.).
L. macrocarpus, N. E. Br. (*M. macrocarpum*, Berger).
L. magnificus, N. E. Br. (*M. magnificum*, L. Bol.).
L. marcidulus, N. E. Br. (*M. flaccidum*, L. Bol., not of Jacquin.).
L. maturus, N. E. Br. (*L. praecox*, L. Bol., not of F. Mueller).
L. matutinus, N. E. Br. (*M. matutinum*, L. Bol.).
L. microstigma, N. E. Br. (*M. microstigma*, L. Bol.).
L. multiradiatus, N. E. Br. (*M. multiradiatum*, Jacq.).
L. multiseriatus, N. E. Br. (*M. multiseriatum*, L. Bol.).
L. mutans, N. E. Br. (*M. mutans*, L. Bol.).
L. parvus, N. E. Br. (*M. tenue*, L. Bol., not of Haworth).

- L. pauciflorus*, N. E. Br. (*M. pauciflorum*, L. Bol.).
L. paucifolius, N. E. Br. (*M. paucifolium*, L. Bol.).
L. Peersii, N. E. Br. (*M. Peersii*, L. Bol.).
L. perspicuus, N. E. Br. (*M. perspicuum*, Berger).
L. Pittenii, N. E. Br. (*M. Pittenii*, L. Bol.).
L. plautus, N. E. Br. (*M. latum*, L. Bol.). not of Haworth).
L. Pocockiae, N. E. Br. (*M. Pocockiae*, L. Bol.).
L. polyanthon, N. E. Br. (*M. polyanthon*, Haw.).
L. productus, N. E. Br. (*M. productum*, Haw.).
L. promontorii, N. E. Br. (*M. promontorii*, L. Bol.).
L. reptans, N. E. Br. (*M. reptans*, Ait.).
L. rupestris, N. E. Br. (*M. rupestris*, L. Bol.).
L. Rustii, N. E. Br. (*M. Rustii*, Berger).
L. saturatus, N. E. Br. (*M. saturatum*, L. Bol.).
L. scaber, N. E. Br. (*M. scabrum*, Linn.).
L. sociorum, N. E. Br. (*M. sociorum*, L. Bol.).
L. spectabilis, N. E. Br. (*M. spectabile*, Haw.).
L. spiniformis, N. E. Br. (*M. spiniforme*, Haw.).
L. Stayneri, N. E. Br. (*M. Stayneri*, L. Bol.).
L. stenopetalus, N. E. Br. (*M. stenopetalum*, L. Bol.).
L. stenus, N. E. Br. (*M. stenum*, Haw.).
L. stipulaceus, N. E. Br. (*M. stipulaceum*, Linn.).
L. swartbergensis, N. E. Br. (*M. swartbergense*, L. Bol.).
L. tegens, N. E. Br. (*M. tegens*, F. Muell.).
L. tenuifolius, N. E. Br. (*M. tenuifolium*, Linn.).
L. tulbaghensis, N. E. Br. (*M. tulbaghense*, Berger).
L. turbinatus, N. E. Br. (*M. turbinatum*, Jacq.).
L. vallis-gratiae, N. E. Br. (*M. vallis-gratiae*, Schl r. and Berg.).
L. Vanzijliae, N. E. Br. (*M. Vanzijliae*, L. Bol.).
L. variabilis, N. E. Br. (*M. variabile*, Haw.).
L. verecundus, N. E. Br. (*M. verecundum*, L. Bol.).
L. viatorum, N. E. Br. (*M. viatorum*, L. Bol.).
L. Watermeyerii, N. E. Br. (*M. Watermeyerii*, L. Bol.).
L. Woodburniae, N. E. Br. (*M. Woodburniae*, L. Bol.).
L. Wordsworthiae, N. E. Br. (*M. Wordsworthiae*, L. Bol.).
L. Zeyheri, N. E. Br. (*M. Zeyheri*, Salm Dyck).
L. zygochylloides, N. E. Br. (*M. zygochylloides*, L. Bol.).
N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 87: 515. 1930/
(Continued from page 212.)

CONOPHYTUM, N. E. Br.

C. longistylum, N. E. Br. -- Growths 4-6 lines high, 3-7 lines in diameter, obconic, flattish or very slightly convex at the top, which is circular or elliptic in outline; orifice $\frac{1}{2}$ -1 line long, almost level with the top; surface smooth, light glaucous-green, evenly wrinkled over the top with small, dark green dots and the orifice outlines with arched rows of more or less confluent dots. Old growths drying up very slowly into sheaths. Calyx 4-lobed; tube very $2\frac{1}{2}$ line long,serted 1 line from the orifice, greenish-white; lobes $1\frac{1}{2}$ line long, ascending, not pressed against the corolla-tube, rather firm and green, with membranous edges,

515 slightly pustulate as seen with a lens, shining. Corolla about 6 lines in diameter, expanding in sunshine, closing between 5 and 6 p.m.; tube about 3 lines long and as long as the entire calyx, whitish; petals in 1 or 2 series, lax, about 4 lines long, $1\frac{1}{2}$ line broad, linear, obtuse, rosy-magenta. Stamens in about three series, all at the mouth of, or exserted from, the corolla-tube; filaments and anthers yellow. Style $6\frac{1}{2}$ lines long, exserted $2\frac{1}{2}$ lines beyond the stamens, with 4 stigmas $\frac{1}{2}$ -1 line long at its apex, yellowish.

Little Namaqualand, Pillans 5, 184.

C. luteum, N. E. Br.-- Growths obconic, much resembling those of *C. truncatellum*, N. E. Br., 6-9 lines high and 4-10 lines in diameter at the top, which is circular in outline, truncately flat or flattish and rounded into the sides, with the orifice $1\frac{1}{2}$ line long and depressed in a slight transverse depression or, in larger flowering growths, almost level with the top; surface smooth, glabrous, dull green or greyish-green, sprinkled on the top with separate dots of darker green. Calyx in the only flowers seen not exserted, $2\frac{1}{2}$ -lines long, shortly 4-lobed, whitish, but as it flowered in November without direct sunlight the flowers were probably not properly developed. Corolla 9-10 lines in diameter, expanding in daytime, closed at night; tube partly exserted from the calyx and about $3\frac{1}{2}$ lines long and $1\frac{1}{2}$ line in its greater diameter, yellow; petals about 5 line long and $\frac{1}{2}$ -1 line broad, obtuse and variably denticulate at the apex, clear bright yellow, shining. Stamens numerous, all distinctly exserted from, or the shorter at the mouth of, the corolla-tube; filaments and anthers yellow. Style nearly as long as the longest stamens and about $2\frac{1}{2}$ lines in length, with 4-5 small stigmas $\frac{1}{2}$ -line long at the apex, orange-yellow.

Little Namqualand? Marloth 11, 950.

This species, *C. longistylum* and *C. truncatellum*, are all so similar in their vegetative growths that they might easily be mistaken for one another, but the flowers of all three are entirely different.

C. notabile, N. E. Br.-- Growths when introduced about 6 lines high, 6 lines broad and 5 lines thick, elliptic in outline viewed from above and slightly ridged on the otherwise flattish top, afterwards becoming to 1 line high, 1 inch broad and 9 lines thick, compressed, keeled over the top and down the sides, without any notch, but slightly flattened at the central part of the top and thence rounded into the sides, smooth, glabrous, of a light and slightly bluish-green, with a lunate purple mark on each side of the $1\frac{1}{2}$ -line long orifice, and a purple line along the keel over the top, which is sometimes connected with the lunate marks and sometimes separate from them, without any other dots or markings. Flowers unknown.

Believed to a native of Little Namaqualand, but locality and collector unknown.

A single growth of this very distinct species was given to me by Mr. D. O'Donohue in 1927, soon after it was imported, and after two years' cultivation has greatly increased in size and altered in shape as above described, but still remains only a single growth, so that it evidently does not increase very rapidly and has not other species known to me that I have no hesitation in describing it.

516 *C. Naughani*, N. E. Br.-- Growths usually growing singly, and as imported are $\frac{1}{2}$ -1 inch high, 3-8 lines broad and $2\frac{1}{2}$ -7 lines thick,

16 compressed-cylindric, oblong or quadrate-oblong in side view, notched or shortly 2-lobed at the apex, with the notch gaping and 1-2 $\frac{1}{2}$ lines deep, and the lobes rounded or somewhat conical on the top, very obtuse and often faintly beveled transversely to the orifice; substance soft and pulpy, smooth, glabrous, uniformly light green to the lower part, with the top of the lobes pallucid or semi-transparent, of a pale and slightly yellowish green. Flowers seen only in a withered condition. Calyx 2-lobed, covered with microconic points, green; lobes about 2 lines long, deltoid-ovate, obtuse, with rather narrow, membranous margins. Corolla apparently about 7-8 lines in diameter; tube 2 $\frac{1}{2}$ lines long; outer petals in 2 or 3 series, about 3 lines long and 1 $\frac{1}{2}$ -line broad, cuneately linear, obtusely rounded or notched at the apex; inner petals (or, perhaps, staminodes) 2-2 $\frac{1}{2}$ lines long, filiform. Stamens numerous, in several series, arising at different heights all way up the corolla-tube from its base, about 2 lines long and the upper exerted about 1 $\frac{1}{2}$ line from the corolla-tube. Stigmas 6, arising from the raised central part of the top of the ovary, slenderly subulate and about 1 line long and 1 line broad; expanding-keels contiguous into a stout central keel, honey-coloured, with broad, membranous marginal wings, united in pairs between the valves; cells without cell-wings or placental tubercles. Seeds about 1 $\frac{1}{3}$ -line long, somewhat pear-shaped, smooth, light brown.

Kenhart Division: Near Pofadder, Maughan Brown 710; Fuller 19.

This would appear to be near *C. subfenestratum*, Schwant., which I have not seen, but according to the imperfect description of it *C. subfenestratum* differs from *C. Maughani* by having obconic growths of a bright and shining green, with the lobes marked with large and crowded, pellucid dots, and the capsule with only 4 valves and cells; also it grows in Namaqualand, in a different locality.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 88: 8. 1930.

(Continued from page 516,
Vol. LVXXXVII.)

3 *C. rufescens*, N. E; Br. -- Growths, as received, solitary, 6-12 lines long, 5-7 lines broad, and 4-6 lines thick, since enlarged to 15-18 lines long, 7-10 lines broad, and 6-9 lines thick, cylindrically ellipsoid, cylindric or slightly obconic, notched or shortly 2-lobed at the top and the notch 1-2 lines deep, with the lobes rounded on the top and the orifice between them extending nearly across the top; soft and pulpy in substance, glabrous, smooth, dull purplish, not shining, with the top of the lobes pellucid and window-like, and the rest of the body sprinkled with large pellucid dots. Flowers not seen. Capsule 1 $\frac{1}{2}$ line in diameter when closed, shortly and very broadly obconic below, with 6 valves and cells; valves rising into an acute cone, 1 line high on the top and when expanded 1 $\frac{1}{2}$ line long and 1 line broad; expanding-keels contiguous into a stout central keel, pale honey-coloured, with broad membranous marginal wings that are united in pairs between the valves, but tearing apart sometimes; cells open, without cell-wings. Seeds about $\frac{1}{2}$ line long, somewhat pear-shaped, smooth, light brown.

Little Namaqualand: near Pofadder, Maughan--Brown.

This is closely allied to *C. Laughani*, but seems to be distinct by the coloration of the growths and the pointed capsule. When going to rest and the colour of this species sometimes becomes very vivid and brilliant.

C. longum, N. E. Br.-- Growths, as imported 1-1½ inch long, 5-7 lines broad and 4-6 lines thick, but since has become 1½-2½ inches long, 7-10 lines broad and 5-7 lines thick, slightly compressed-cylindric, two-lobed at the apex, with the lobes pressed together, rounded at their apex and the cleft between them 2½-3 lines deep and extending right across them 2½-3 lines deep across the growth; substance soft and pulpy, smooth, slightly velvety to the touch from being covered with microscopic points; the top of the lobes is pellucid and window-like, pale greenish and separated from the uniformly light green body of the growth by an indistinct band of yellowish-green, and the whole sprinkled with large pellucid dots. Flowers and fruit unknown.

Little Namaqualand: Near Een Riet, Pole Evand 6.

The very elongated growths, velvety surface and coloration distinguish this from all the other pellucid-topped species.

C. praesectum, N. E. Br.-- Grows forming small clumps, or sometimes growing singly, and as imported 8-14 lines long, 5½-8 lines broad and 2-5 lines thick, compressed cylindric or oblong in side view, shortly 2-lobed and somewhat truncate at the top; lobes 1½-3½ lines long, pressed together, convexly truncate at the top, their upper part very distinctly window-like and semi-transparent in side view when held against the light; substance soft and pulpy; surface smooth, and when viewed with a strong lens against the light seen to be covered with microscopic points, scarcely pubescent and scarcely velvety to the touch, green, with the upper part of the sides often tinted with brown, and the window part of the lobes pallid. Flowers seen only in a withered condition. Calyx usually 6 (sometimes 5)-lobed, green; tube 3-4 lines long; lobes 2 lines long, 4 of them with white membranous margins. Corolla apparently about an inch in diameter; tube 4-5 lines long; petals in 1-2 series, 5-5½ lines long, 1/3-½ line broad, cuneately linear, obtuse or slightly notched at the apex, with a few inner ones that are shorter and filiform-linear (perhaps staminodes). Stamens numerous, in 3-4 series in the throat of the corolla-tube, all exserted and the longer exserted about 1 line from the tube; filaments and anthers yellow. Style 3½-4½ lines long and nearly or quite as long as the corolla-tube, filiform; stigmas 5-6, filiform, 4-1 line long. Capsule 1½-2 lines in diameter when closed, pallid, slightly convex on the top, with 5-6 valves having their tips raised into a short, conical point at the centre; valves almost transparent when expanded, pallid; expanding-keels contiguous into a membranous stout central keel, ochraceous, with very broad cell-wings or placental tubercles. Seeds 1/3 line long, sub-globose, without a point, smooth, light brown.

Perhart Division: Near Pofadder, Fuller 19.

This is allied to *C. Friedrichiae*, Schwant., but usually forms small clusters of growths instead of being solitary, the growths also appear to be smaller, and the flowers are entirely different in structure.

N. E. Brown
(To be continued.)

When founding the genus *Nemanthus* in *The Gardeners' Chronicle*, 1925, Vol. LXXVIII, p. 423, I suspected that the plants I included in it might possibly belong to two different genera, because some of the species had all the petals spreading in one plane and the stamens collected into a cone, while others had the petals somewhat laxly recurved, spreading in different planes or series, and the stamens in a cylindric mass. But I did not venture to separate them into different genera because fruit of the latter group was not available. All the fruits (belonging to two species) I then possessed belong to the group with the stamens in a cone. Having now obtained fruit of one species of the other group, I find it so distinctly different in structure that, taken in conjunction with the different floral characters, I now separate it as a distinct genus.

Beside these, there is a small group of plants of the same alliance that have hitherto remained under *Meembryanthemum*, or have taken into consideration. These are all more or less similar in habit, being either very dwarf and forming in big clumps, or are stemless or nearly so, with a firm, fleshy rootstock and rosettes of crowded leaves differing in form, and whose floral and fruit characters differ considerably. And it will be convenient to deal with them here as forming one group of nearly allied genera. Therefore a key is here given to the genera into which I now divide this group, followed by a descriptive account of them. In the key, leaf and floral characters are given primary importance, because they are those that the cultivator becomes acquainted with, while fruit is not often seen under cultivation in Europe, although the fruit-characters of each genus distinctly differ from those of the other genera of the group. I regret that some of the descriptions are very imperfect, but as they have never been adequately described, and I have been unable to obtain material to make the descriptions more complete, they must await the advent of the next monographer.

1. Leaves opposite, neither dotted, warted nor pustulate. 2

Leaves opposite, often crowded in rosettes, either smooth and distinctly marked with immersed dots, or slightly rough from raised dots or small white or greenish warts or pustules, glabrous or covered with microscopic points, and then somewhat velvety to the touch. Flowers expanding in the morning or afternoon. 3

2. Leaves flattened, smooth and velvety-puberulous, whitish-green. Flowers expanding after 5 p.m. Calyx sub-equally 5-lobed. Petals in 3 or 4 series. Stamens erect, not collected into a cone. Stigmas 10-13. Expanding-keels of fruit with awn-like tips and short, broad, marginal wings that are united in pairs between the valves. Cells roofed with cell-wings, no placental tubercle. *Deilanthus*.

Leaves acutely trigonous, very smooth and quite glabrous. Plant forming large clumps with short, stout, densely leafy branches. Calyx sub-equally 5-lobed and the lobes keeled. Stigmas and valves and cells of the fruit 7 or 8. Expanding-keels narrowly diverging from the base and much raised, thin with acute, minutely-toothed edges and

produced into straight awns, and with irregularly toothed marginal wings below the awns. *Perissolobus*.

3. Petals in 1 or 2 series, all closely overlapping and spreading in one plane as if in one series. 4

Petals in 2-4 series, spreading or recurving more or less laxly in different planes or series. 7

4. Stamens and staminodes collected into a broad, compact cone that is fully exposed to view to its base. 5

Stamens loosely erect, or the outer more or less spreading, not collected into a compact cone; no staminodes. Leaves somewhat clavate and semi-terete or trigonous, with blunt angles in transverse section, and with the obtusely rounded apex covered with white warts. Calyx subequally 6-lobed. Stigmas 6. *Verrucifera*.

5. Leaves viewed from above linear-lanceolate and often with parallel sides, or lanceolate, or ovate, acute, keeled and trigonous at the apical part. Calyx 5-lobed. Stigmas 7-10. Ovary inferior. Cells of the fruit quite open, either without cell-wings or with rudimentary cell-wings that stand quite erect back to back; no placental tubercle. (See Fig. 106). *Nananthus*.

Leaves spatulate, dilated into a more or less flattened blade, very obtuse or rounded at the apex, and covered with white or whitish-green pustules or warts of compound structure under a microscope. Calyx 5 or 6-lobed. Cells of the fruit roofed with membranous cell-wings; no placental tubercle. 6

6. Stigmas 10-13. Ovary and capsule half or more than half-superior, with 10-13 valves and cells. *Acaulon*.

Stigmas 5-6 (in one species represented as 5 or 9 or 10). Ovary and capsule inferior, with 5-6 valves and cells (Fig. 107). *Titanopsis*.

7. Leaves with pellucid dots when held against the light. Flowers with 3 or 4 series of conspicuous staminodes (barren stamens). Stigmas and valves and cells of the capsule 6-10. Valves of the capsule with an acute central keel and the expanding-keels about half as long as the valves and diverging from the base, without wings or awns. *Khadia*.

Leaves with either dark green dots or opaque pustular dots. Staminodes few or none. 8

8. Dots on the leaves often whitish when fully exposed to the sun. Basal part of the stamens partly concealed in the cup formed by the base of the petals. Stigmas 6-10. *Rabiea*.

Dots on the leaves dark green and the surface smooth and

usually velvety to the touch. Stamens in a very prominent column, with the basal part fully exposed to view by the wide-spreading base of the petals. Stigmas 5-6 (Fig. 108). repodesma.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 88: 474. 1930.
(Continued from page 279.)

ACAULON, N. E. Br.

Stemless, perennial Succulent, with a firm, fleshy root-stock,. Leaves opposite, united at the base, spatulate, arranged in a somewhat 4-ranked rosette, very spreading, covered with raised dots or small pustules. Flowers epigynous to be axillary, solitary or 2 or 3 in a sessile, bracteate cyme, pedicellate. Calyx subequally 5-lobed, pustulate. Petals numerous, free, all widely spreading and imbricating in one plane, as if in one series. Stamens numerous, all collected into a broad cone, the outer (staminodes) without anthers; filaments hairy at the basal part. Stigmas 10-13, subulate, laterally compressed and fringed on their inner edges. Ovary more than half-superior, very convex above, flattish-convex beneath, with 10-13 shallow cells; placentas on the floor of the cells. Capsule half or more than half-superior, flattened, about equally convex above and beneath, with 10-13 valves and cells, and with the sutural ridges somewhat elevated and gaping; valves with a thin central keel from base to apex within; expanding-keels adnate only to the base then diverging, with contiguous at their base, then diverging, with membranous marginal wings which at the basal part are broad and united in pairs and stand erect so as to form a thin, wing-like membranous keel between the bases of the valves, and at the apical part taper into a slender linear membranous tips nearly as long as the valve; cells more than half-superior, acutely roofed with membranous cell-wings, rising above the level of the base of the valves into a broad cone terminating in a series of points; no placental tubercle. Seeds globose-ovoid, pointed at one end, nearly smooth to the eye, but microscopically tuberculate, brown.-- N. E. Br. in Journ. Bot., 1928, 77.

A monotypic genus, native of South Africa.

The name is derived from the Greek, aculos, stemless, because the plant has no evident stem.

This genus is nearly related to Titenopsis, from which it is clearly distinguished by having 10-13 (instead of 6) stigmas, and by its partly superior ovary and biconvex capsule.

In South African Gardening, 1929, p. 245, doubt is expressed as to the correctness of my statements concerning the structure of *A. rosulatum*, and that drawings possessed by Mrs. Bolus "show an inferior ovary." This statement is quite contrary to the figure of it which Mrs. Bolus published with the original description as I have quoted under the species, where the ovary is represented (wrongly, in my opinion) as being wholly superior and sub-globose. I find it distinctly more or than half-superior, and as represented in Fig. 199, which was made twenty years ago from the plant that flowered at Kew in 1910.

474 1.-- *A. rosulatum*, N. E. Br., in Journ. Bot., 1928, 77.--
Leaves spatulate, 8-12 to a growth, $\frac{1}{2}$ -2 inches long, 6-13 lines
broad at the dilated apical part, which is transversely sub-rhomboidal and very obtuse or broadly rounded or sub-acute at the apex, and at 4-7 lines below the tip is suddenly contracted, or gradually tapers into the cuneate petiolar part, flat above, slightly convex on the back, glabrous, densely covered with small and slightly raised, grey-green pustules on a dull green ground, producing a somewhat dull greyish-green appearance, not glaucous. Flowers axillary, solitary or ultimately developing one
475 or two other flowers from a sessile, bracteate cyme. Pedicels 5-7 lines long, stout, thickening upwards and $2\frac{1}{2}$ lines thick at the apex. Calyx-lobes 3-3 $\frac{1}{2}$ lines long, $2\frac{1}{2}$ -3 $\frac{1}{2}$ lines broad, ovate, obtusely pointed, very flat, spreading horizontally, pustulate like the leaves, dull green, three of them with very narrow membranous margins. Petals about 40-56- in 1 or 2 series, all horizontally spreading in one plane from the very base, 4-4 $\frac{1}{2}$ lines long, $2\frac{1}{3}$ -1 line broad, linear, acute, light straw-yellow, marked with a central red line on both sides. Stamens about $2\frac{1}{2}$ lines long, collected into a broad cone, the outer without anthers; filaments hairy at the basal part, pale straw-yellow, somewhat shining; anthers small, creamy-white. Stigmas about 12, subulate, compressed laterally, fringed along the inner margin, whitish. Capsule as described under the genus.

Mesembryanthemum rosulatum, Kensit in Tr. R. Soc. S. Afr., I, 152, t. 21, f. B. (1909); *Alcinopsis rosulata*, Schwant. in Zeitschr. f. Sukk., 1926, 179, and 1927, 105; L. Bol. in Notes on Mesemb. I, 67, and in S. Afr. Gard., 1929, 208, with fig. in which the cells of the ovary are represented much too deep. See also N. E. Br. in Journ. Bot., 1928, 72, concerning the invalidity of *Alcinopsis*.

Willowmore Division: near Willowmore, Haward. Pillans 1266; Kruidontein, Pole Evans, 6921. Miller District, Pers.

The above description, as previously stated, was made partly from a living plant, collected by Dr. J. Haward during a cricketing tour in South Africa, which flowered at Kew on August 3, 1910, and partly from living and dried material sent to me by Dr. Pole Evans and Professor R. E. Compton. The diagrammatic section of the flower (Fig. 199) was made from the Kew flower on the date mentioned.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 88: 513. 1930.
(Continued from page 475.)

VERRUCIFERA, N. E. Br.

513 Stemless, succulent perennials with a fleshy root-stock. Leaves opposite, densely crowded into a rosette, ascending, semiteretely or trigonously clavate, with the very obtuse apex covered with crowded white arts composed of microscopic lime-cells. Flowers solitary. Calyx sub-equally 6-lobed down to its union with the ovary. Petals in 1 or 2 series, all widely spreading in one plane as if in one series. Stamens loosely erect, slightly inflexed at the

513 base, the outer more or less spreading. Petals connected into a ring. Stigmas 6, filiform or subulate, as long as or exceeding the stamens. Ovary half or more than half superior, with 6 cells; placentas on the floor of the cells. Capsule very shortly and broadly spreading obconic below, slightly convex and with 6 slightly raised valvular sutures above; valves widely spreading or recurved when expanded; expanding-keels with thin edges very closely expanding-keels with thin contiguous into a stout central keel for most of their length, enlarging upwards, then diverging at the tips, minutely toothed on the inner edge, and with broad marginal wings reaching to the tip of the valve and obtusely rounded at the apex; cells roofed with semi-transparent cell-wings; lightly compressed, smooth.

Species 3, natives of South-west Africa. The type of the genus is *V. Schwantesii*, N. E. Br.

The name is derived from the Latin, verruca, a wart; and fero, to bear, in allusion to the white warts borne at the tips of the leaves.

The species of this genus were included by Schwantes in *Titanopsis*, but they differ from that genus by the stamens not being collected into a cone, by the half-superior ovary, and by the different expanding-keels of the fruit, while the subclavate, white-warted, more numerous and more ascending leaves offer vegetative distinction that is very obvious.

Key to the Species.

Flowers subsessile, shorter than the leaves, which are covered with warts at the apex for 2-3 lines of their length. *Schwantesii*.

Flowers on pedicels 6-7 lines long and as long as or longer than the leaves, which are covered with warts at the apex for only about $1\frac{1}{2}$ line of their length. 2. *Luderitzii*.

Flowers unknown; leaves with fewer and larger warts than in the above species. 3. *Hugo-Schlechteri*.

1.-- *V. Schwantesii*, N. E. Br.-- (Fig. 213 and 214, C.). Rosettes, $1\frac{1}{2}$ -1 $\frac{1}{4}$ inch in diameter. Leaves crowded, ascending, 6-9 lines long, $2\frac{1}{2}$ -4 lines broad and 2-3 lines thick at the apical part, clavately semiterete, broadly rounded at the apex, flat on the face, rounded at the back, glabrous and smooth for most of their length with from 2-3 lines of the apical part covered with white or whitish tubercles or warts composed of minute line-cells, the smooth part being light green, tinted with purplish at the basal part. Flowers subsessile, shorter than the leaves. Calyx very shortly obconic below; lobes about 3 lines long and $1\frac{1}{2}$ -2 lines broad, deltoid, obtuse, with a few small tubercles on the back at the apex like those on the leaves. Corolla 9-10 lines in diameter; petals in 1 or 2 series, about 4-5 lines long, $\frac{1}{2}$ -1 line broad, linear, obtuse, yellow. Stamens 6, subulate, about as long as the stamens. Capsule 4-5 lines in diameter when closed, very shortly and broadly obconic below, slightly convex, with six slightly raised sutures above, pale grey outside and pale brownish inside, with ochreous-brown expanding-keels that are contiguous into a stout, club-shaped central keel for three-quarters of their length, diverging at the tips with broad, hatchet-shaped, obtuse marginal wings; cells roofed with semi-trans-

513 parent cell-wings, without a placental tubercle. Seeds 1/3-line long, subglobose, slightly compressed, pale brown with a darker point.

Mesembryanthemum calcareum, Dint. New Pfl. Deutsch S. W. Afr., 58, f. 50, not of Marloth; Möllers Deutsche Gart.-Zeit. 1911, 343 with figs., and Sukk. S. W. Afr. 22, 23. *M. coccineum*, N. E. Br., in Gard. Chron., October, 1913, LII, 204, and 1921, LIII, 183, fig. 49; Rev. Hort., 1919, 373. *Titanopsis Schwantesii*, Schwant. in Zeitschr. f. Sukk., 1926, 179 and Möllers Deutsche Gart.-Zeit., 1927, 437, with fig.

2.-- *V. Luderitzii*, N. E. Br.-- (Fig. 214, A and B and 215). Plant (including flower) about 1 1/2 inch high, glabrous. Leaves ascending-spreading and rather crowded, triconously-clevate, obtusely rounded at the apex, 6-9 lines long, 2 1/2-3 1/2 lines broad and 2-3 lines thick at the dilated apex, flat on the face, very rounded or faintly and very bluntly keeled on the back, whitish-green or greyish-green, sometimes tinged with rose, covered at the apex for 1/2 line only of its length with small and rather hard, white warts or rustules, of which some 20-24 are larger than the others, smooth and rather hard, white warts or rustules, of which some 20-24 are larger than the others, smooth below. Pedicels 6-7 lines long and as long as or rather longer than the leaves, 1 line thick, terete, smooth, whitish-green, with a faint pinkish tinge and dotted at the apical part. Calyx shortly conical below, 2-lobed, dotted; lobes horizontally spreading with reflexed tips, 3-3 1/2 lines long, deltoid-ovate, subacute, of a somewhat chalky-green with a pinkish tinge and with 6-8 small pustules at the apex, and covered with longitudinal rows of microscopic whitish dots, only seen under a strong lens. Corolla 14-16 lines in diameter when fully developed, expanding between 5 and 6 p.m.; petals in about 2 series, widely spreading in one plane, with recurving tips 5-6 lines long, 1-1 1/2 line broad, linear, slightly narrowing from above the middle to a very obtuse or rounded apex, bright golden-yellow to the base, without a darker midline, very shining, much paler or whitish-yellow on the back, with the tips in the final stages orange-yellow. Stamens about 3 lines long, loosely erect or but slightly inflexed, the outer recurving or spreading outwards; outer filaments yellow, glabrous; the inner white and bearded at the base, yellow above; anthers white when pollen is shed; no staminodes. Glands connected into a ring, very dark green. Stigmas 6, about 4 lines long, filiform, ascending-spreading with their tips curling among the stamens. Ovary nearly superior, conically convex, green, with 6 cells; placentas on the floor of the cells. Fruit not seen.

Titanopsis Luderitzii, Tischer in Zeitschr. f. Sukk., 1927, 156, with fig.

South-west Africa: Region of Luderitz Bay, collector unknown.

Described from a living plant kindly lent to me by Mr. T. King, of Ilfracombe, whose photograph of the plant is reproduced at Fig. 215, I have compared Mr. King's plant with leaves from the type of *V. Luderitzii* kindly communicated by Dr. H. Tischer, and find that the latter are identical with those of Mr. King's plant. Dr. Tischer has not seen its flowers, but the much longer pedicels as well as the leaf characters seem clearly to distinguish this plant from *V. Schwantesii*.

3. *V. Hugo-Schlechteri*, N. E. Br.-- Plant very similar to

513 *T. Schwantesii* in general appearance. Leaves described as being 6-8 lines long, 2-2½ lines broad and 1½-2 lines thick, but probably become larger under cultivation, in form like those of *T. Schwantesii*, but with the triangular pustular part at the apex sloping backwards and making an angle with the smooth upper surface of the leaf, and covered with larger and fewer pustules than occur on those of *T. Schwantesii*, there being about 6 large and 30 smaller pustules.

Mesembryanthemum Hugo-Schlechteri, Tischer in *Zeitschr. f. Sukk.*, 1926, 203. *M. Astridae*, Dint., *Sukk. S. West Afr.*, 93, name only. *Titanopsis Hugo-Schlechteri*, Dint. and Schwan. in *Möllers Deutsche Gart.-Zeit.*, 1927, 157 and 156, with fig.

South-west Africa: On an undulated plain in the vicinity of Warmbad; Schlechter, Dinter, and the description of it is not very satisfactory, but it certainly seems to differ from *V. Schwantesii* by having fewer of the larger pustules on the leaf. In the leaf seen there are only two rows of them on the upper side of the leaf, and they are rather larger and seem slightly different in microscopic structure from those of *V. Schwantesii*. The colouring of the leaves is described as brownish-grey-green, shading into dull purple as the base, with pallid pustules at the apex. A variety is described as "var. *alboviridis*, Dint.," which only differs by having the leaves greenish-white as in *V. Schwantesii*. But as *V. Schwantesii* varies from ivory-white to green, with or without a purplish tinge on the very same plant, in different purplish year, according to the amount of sunshine and water it has received. I consider that the varietal name is superfluous. Although the discovery of this plant is claimed by Professor Dinter, I have been credibly informed that it was discovered by Mr. Schlechter before Dinter had arrived at Warmbad.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 89: 13. 1931.

(Continued from page 513, Vol. LXXXVIII.)

TITANOPSIS, Schwant.

13 stemless perennials, with a fleshy root-stock,. Leaves opposite, crowded in dense rosettes, spatulate, covered with raised, whitish or tinted pustules, formed of cells filled with lime. Flowers solitary, subsessile or pedicellate, expanding in the afternoon. (See Fig. 107, p. 272, Vol. LXXXVIII). Calyx subequally 6-lobed down to its union with the ovary, and the lobes pustulate like the leaves, 4 of them with membranous margins. Petals free, in one series, linear. Stamens numerous, collected into a cone, filaments bearded at the base. Glands in a crenulate ring. Stigmas 5 or 6, or 10 in one species, filiform. Ovary inferior, flat-tish or conical at the top, 5 or 6-celled; placentas on the outer wall of the cells. Capsule broadly and shortly obconic, flat on the top, with 5 or 6, or in one species 10, valves and cells; valves as broad as long; expanding-keels rather stout and sub-contiguous at their base half then widely diverging, minutely toothed on the inner edge, excurrent at the margin about half-way up the valve, and ending in an awn reaching to the tip of the valve, and with a membranous margin to the part below the awn; cells roofed with membranous, semi-transparent cell-wings, and without a placent-

13 tal tubercle. Seeds many in a cell, sub-globose, with a small point, very minutely tuberculate.-- Schwantes in Zeitschr. f. Sukk., 1936, 178.

Species few, natives of South Africa. The type of the genus is *T. calcareus*, Schwant.

The name is derived from the Greek, Titan, the sun, and opsis, appearance, from the sunlike appearance of the flowers.

Key to the Species.

Flowers yellow; stigmas 6; dilated part of leaf densely pustulate all over. 1. *calcareus*.

Flowers deep rose-pink; stigmas 10; dilated part of leaf with small, scattered pustules that become crowded around the apical margin. 2. *crassipes*.

Flowers white; stigmas 5, as the fruit has 5 valves; dilated part of leaf covered with small pustules. 3. *spethulata*.

1. *T. calcareus*, Schwant., in Zeitschr. f. Sukk., 1926, 178, and 1927, 105. Fig. 8.-- Rosettes $1\frac{1}{2}$ -2 inches in diameter, composed of

14 several crowded, spatulate leaves, 7-14 lines long, 5-10 lines broad at the dilated, triangular-ovate apical part, which is very obtuse, 2-3 lines thick, greyish-green, covered with greyish-white rustules. Flowers subsessile. Calyx usually 3-lobed; lobes about $2\frac{1}{2}$ lines long, 2-3 broad at the base, ovate-oblong, obtuse, pustulate at the tips like the leaves, dull grey-green, tinged with purple, the 4 inner with membranous margins. Corolla about an inch in diameter, expanding in day-time; petals between 30 and 40, in ones, about 1 line long, 1-1 line broad, linear, obtuse, yellow, with a darker midline at the base. Stamens about $2\frac{1}{2}$ lines long, collected into a broad cone; filaments light yellow, anthers white. Glands connected into a crenulate ring, dark green. Stigmas 6, finally $3\frac{1}{2}$ -4 lines long, filiform, with their tips recurving over the stamens, yellow. Ovary flattish, or slightly convex at the top, green, 6-celled. Capsule in 4-8 lines in diameter when closed, whitish on the flat top, with 6 valves and cells; valves pale brownish within; expanding-keels chestnut-brown, with pallid marginal wings. Otherwise as for the genus. Seeds $1/3$ -line in diameter, pale brown.

Mesembryanthemum calcareum, Marl. in Tr. S. Afr. Phil. Soc., VIII, 45, with fig. and col. (1898), and in Gautier's *Tierens* Prod., II, pt. 3, 337, and Fl. S. Afr., I, 406, t. 85; *Botanical*, 550. Syst. Bot., ed. 2, 330; Cartwright, 191, 74; Meyer, *Bot. Abh.*, 572; Rev. Hort. Belge, XL, 187.

Griqualand West: near Kimberley, Marloth; near Griquatown, Marloth. Recorded from the Hanover Division and also found in other parts.

This is one of the plants that so closely resembles its surroundings as to be easily overlooked unless in flower. Dr. Marloth calls attention to this close resemblance at the places cited, and when he first sent a plant of it to my self he also sent with it pieces of the limestone among which he found it growing, and as one of the stones had a bit broken out of it, into which a blade of one of the leaves of this plant just fitted, I placed the stone with the plant

14 having one of its leaves so fitted into the cavity upon the ground, and standing over it, at my own height, I could not detect where the leaf ended and the stone began, although blessed with good eyesight, so exactly did it match the stone in texture and colour. This indicated to me how very easily this plant might be overlooked, and upon mentioning this fact to Dr. Burt Davy, he immediately told me that on one occasion, in the area where this plant grows, he passed a dried-up vley, and thinking that there ought to be some plant growing in it, he got down into the vley, but could not see any plants growing there. However, after sitting down for a few minutes, he presently noticed something that seemed different from the stones covering the ground, and upon examination, found it to be a plant of *T. calcarea*, and then upon more closely examining the place he found that there were hundreds of plants growing there, although at first he had been unable to detect a single plant. Fig. 8, which is from a photograph kindly sent to me by Mr. T. N. Leslie, will give some idea of the manner in which this plant simulates its natural surroundings and illustrates Dr. Burt Davy's statement.

T. calcarea is easily cultivated if not overwatered, and I am informed by Mr. T. N. Leslie that it ought to be quite hardy here if kept dry in winter, as he states that it will withstand twenty degrees of frost without injury.

The pustules or tubercles on the leaves of this plant are very interesting structures and form very charming microscopical objects. Each tubercle consists of a multitude of minute, slightly pointed cells filled with some form of lime (probably oxalate), whose whiteness contrasts with the green colouration of the leaf in a very effective manner. When this plant is cultivated in soil that does not contain much lime stone, the tips of the leaves assume a beautiful rosy-purple colour, and when such a leaf is examined under a binocular microscope, the contrast of the white lime-cells with the rosy and green tissue surrounding them make this an exceedingly beautiful object.

2. *T. crassipes*, W. E. Br.-- Habit of *T. calcarea*. Leaves in 3-5 pairs to a growth, flat, spatulate, $\frac{1}{2}$ -1 inch long, 4-6 lines broad at the dilator, transverse and somewhat fan-shaped apical part which is very broadly rounded at the apex and rather abruptly contracted into a cuneate petiole, the dilated part covered with tubercles, that become more crowded along the apical margin, glabrous, greyish-green with the apical edge reddish. Flowers solitary, subsessile. Calyx sub equally 5-lobed, obconic and smooth below, tuberculate on the lobes which are about 4-5 lines long and 2-3 lines broad, ovate, obtuse. Corolla 11-13 lines in diameter; petals in one series, 4-5 lines long, $\frac{1}{2}$ -1 line broad, obtuse or sub-acute, rose-pink, apparently paler at the base and paler on the back. Stamens numerous, erect in a mass, 2 lines long; filaments bearded at the base, stated to be pink (incarnate) in the Latin description, and white in the English one, but the anthers are figured as yellow. Stigmas 10 in the type specimen, 3 lines long and exceeding the stamens, but are represented on the plate in the entire flowers as 5, and much longer than the radiately spreading over the top of the stamens, but in the dissection they are represented as 10 and erect, and are described as "8-10 filiform" of the same length as the stamens ("staminibus aequilongis"); top of the ovary conical. Fruit unknown.

Mesembryanthemum crassipes, Karloth, in Fl. Pl. of S. Afr., II,

Sutherland Division: Waterkloof, near Sutherland, Marloth, 9681, Levyns 1642.

This is evidently closely related to *T. spathulata*, Schwant., differing by the absence of the abrupt, short point at the apex of the leaves and the colour of the flowers. The above description is made partly from the type specimen and a photograph of the plant that have been very kindly lent to me by Dr. R. Marloth and partly from the original figure and description.

3. *T. spathulata*, Schwant., in Zeitschr. f. Sukk., 1927, 105. Rosettes with 4-6 leaves to each. Leaves 4-7 lines long, 4-5 lines broad at the apical part, flat above, convex on the back, spathulate-obovate, very obtusely rounded at the apex, with a short, abrupt central point, and narrowed downwards from about the middle into a stout petiolar part, the apical part on both sides covered with dot-like pustules of compound structure, the lower part smooth, green, with a red margin. Flower solitary, shortly pedicellate. Calyx 5-lobed, lobes 2-3 lines long, ovate-lanceolate, acute, pustule like the leaves. Corolla not seen, stated to be white. Capsule 6 lines in diameter when closed, hemispherical, with 5 valves.

Mesembryanthemum spathulatum, Thunb., in Nov. Acad. Leop.-Car. Ephem., VIII, Appen, 5; N. E. Br., in Bothalia, I, 162; L. Bol. Notes 1, 136. *Titanopsis spathulate*, L. Bol. in S. Afr. Gard., 1929, 245 (a claim for the name already given by Schwantes, without any added information).

Van Rhynsdorp or Calvinia Division: Intermediate Roggeveld, Thunberg.

This plant is known only from the specimen in Thunberg's Herbarium, which is in fruit only, and from which I have made the above description.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 89: 53. 1931.
(Continued from page 14.)

RABIEA, N. E. Br.

Stemless succulent perennials, with a firm, fleshy rootstock, deep-rooting, glabrous. Leaves opposite, united at the base, arranged in dense rosettes of 3-4 pairs to a growth, ascending-spreading or spreading-lanceolate, linear-lanceolate or ovate, acute, flat on the face, rounded on the back at the basal part and keeled and trigonous at the apical part, covered with slightly raised, whitish or greenish pustules or raised dots. Flowers solitary, subsessile or pedicellate. Calyx produced above its union with the ovary into a short cup, subequally or unequally 5-lobed above. Petals numerous, free, in 3-4 series, cuneately-linear or linear, laxly recurving in an irregular manner in different series. Stamens numerous, arising from the top of the calyx-cup and arranged in an erect, columnar mass, with their basal parts more or less concealed from view by the base of the petals. Stigmas usually 9 or 10 (occasionally 8-12), subulate, much shorter than the stamens. Ovary prominent, slightly concave at the top or with prominent raised sutures, with 9 or 10

53 or occasionally 6-8 rather deer cells; r1 centres on the outer wall of the cells. Capsule (of *R. albinota*, the only species of which fruit has been seen) obconic, with elevated sutural ridges on the top and usually 9 or 10 or occasionally 6-8 valves and cells; expanding-keels nearly reaching to the tips of the valves, closely contiguous for half their length then more or less diverging, with acute tips and broad, pallid marginal wings; cells at first roofed with thin membranous cell-wings, which become unrolled as the seeds are shed; no placental tubercle. Seeds compressed-ovoid, microscopically tuberculate.

Species 4, natives of South Africa. The type of the genus is *R. albinota*, N. E. Br.

The name is given to commemorate the service that Mr. W. A. Robie, of Johannesburg, Orange Free State, has rendered to the Colonial Survery of South Africa, and who from early childhood has taken a active interest in South African plants, and has located many rare species that at present are known only from one or rarely two localities, some of which are known to have been formerly common in the region, but from overstocking the area with stock have become nearly extinct.

The species of this genus are distinct, but it is difficult to express in words the distinctions that are easily seen with the eye, especially as one never has all the plants in flower at the same time to contrast their obvious differences.

Key to the Species.

1. Leaves ascending, deltoid-ovate, acute, 9-12 lines long, 5-6 lines broad. Pedicels 5-7 lines long. Stigmas 6-?, exceeding the stamens and about 3 lines long. 1. *carolinensis*.

Leaves spreading, trigonously-lanceolate, linear-lanceolate or gradually tapering from base to apex, acute, 2-5 lines broad, covered with slightly raised whitish or greenish dots or pustules. 2

2. Leaves apparently not more than 2-2½ lines broad, 9-12 lines long, linear-lanceolate. Flowers sessile or nearly so, about 14 lines in diameter; petals about 6 lines long, very narrow, about ¼-line broad, acute, yellow; stigmas apparently shorter than the stamens. 6. *albipuncta*.

Leaves 2½-5 lines broad. 3

3. Stigmas exceeding the stamens when fully developed and 3-5 lines long. 4

Stigmas shorter than the stamens and about 1 line long. Flowers sessile or subsessile; petals 6-8 lines long. 5

4. Flowers on pedicels 6-7 lines long. Petals 12-15 lines long, 2½-5 lines broad. Petals 7-9 lines long. Stigmas 5 lines long. 3. *tersa*.

Flowers sessile or subsessile. Leaves 12-15 lines long,

3-3 $\frac{1}{2}$ lines broad. Petals 5-6 lines long. Stigmas 3-4 lines long! 5. *cibdela*.

5. Leaves 10-15 lines long, 4-5 lines broad, lanceolate, strongly keeled at the apex,. Petals 3/4-line broad, notched or toothed at the apex, yellow. 2. *albinota*.

Leaves 9-10 lines long, 3-4 lines broad, gradually tapering from base to apex, obtusely keeled on the back and the keel of one leaf of each pair somewhat dilated at the apex. Petals $\frac{1}{2}$ -line broad, obtuse, apparently deep-orange, but seen only when faded, so may have been yellow. 4. *Lesliei*.

1. *R. carolinensis*, N. E. Br.-- Leaves 4-8 to a growth, ascending-spreading, united at the base, 1-1 inch long, 3-5 lines broad at the basal part, somewhat deltoid-ovate, acute, flat or perhaps slightly concave on the face, rounded on the back at the basal part, keeled at the apical part, greyish-green or glaucous-green, marked with whitish or green slightly prominent dots or pustules, glabrous. Pedicels 5-7 lines long. Calyx produced above its union with the ovary into a short cup, subequally 5-lobed and prominently dotted like the leaves; lobes 3-5 lines long, the outer acute, the inner with brown, membranous margins. Corolla apparently about 1-1 $\frac{1}{2}$ inch in diameter; petals numerous in 2- series, the outer apparently about 5-6 lines long and 1/4-1/3 line broad, acute or obtuse, white, when dried marked with numerous linear, red streaks. Stamens and staminodes loosely erect in a cylindric mass, white, but when dried, the filaments are reddish. Stigmas apparently 6 in the only flower examined, but some may have been broken off, erect, filiform or subulate, laterally compressed, acute, about 3 lines long and exceeding the stamens when fully developed, orange according to Mrs. Bolus, reddish when dried. Top of the ovary with large, rounded and very prominent sutural humps behind the base of the stigmas.

Mesembryanthemum carolinense, L. Bol. in Ann. Bol. Herb., III, 128; N. E. Br. in Burt Davy's Fl. Transv., I, 169-162. *Nananthus albiguttus*, L. Bol. in S. Afr. Gard., 1929, 244, figure; not of N. E. Brown.

Transvaal: Crolina, Rogers 19705.

This species was discovered by the Rev. F. A. Roberts in September, 1917, and a specimen of it was sent to Kirstenbosch, from which Mrs. Bolus described the plant. The above description was made from Rogers' dried material, and I find that the figure wrongly named "*Nananthus albiguttus*" above quoted, so exactly represents this plant that I think it cannot be any other species than *R. carolinensis*. The stigmas, however, are represented as 10 and shorter than the stamens; but I am not sure of the number of stigmas in *R. carolinensis*, because, when dissecting dried flowers of these plants, they often break off and get lost among the stamens; and their length often varies according to the age of the flower examined; if young they would be shorter than the stamens. If the figure does not represent *R. carolinensis* it must be a very closely allied species, and certainly bears no resemblance whatever to "*Nananthus albiguttus*, N. E. Br."

2. *R. albinota*, N. E. Br.-- Leaves in 3 or 4 pairs to a growth, spreading, 10-15 lines long, 4-5 lines broad at the middle, thence

53 rapidly narrowing to an acute point that flat on the face, rounded on the back at the basal part and keeled and compressed at the apical part, and the keel in side view abruptly rounded into the apex, which has a recurved mucro, greyish-green, thickly marked with small, whitish pustules or raised dots, especially on the edges and keel; but the dots are sometimes greenish under cultivation. Flowers sessile or nearly so. Calyx produced above its union with the ovary so as to form with the concave top of the ovary a shallow cup, subequally 5-lobed above; two of the lobes acute and rather longer than the other three, which are obtuse, with whitish, membranous margins. Corolla $1\frac{1}{4}$ - $1\frac{1}{2}$ inch in diameter; petals in about 3 series, irregularly arranged and recurved, 6-8 lines long, $\frac{1}{2}$ - $\frac{3}{4}$ lin broad, linear, very obtuse or subtruncate and toothed at the apex, yellow. Stamens erect in a cylindric mass, with the basal part partly hidden from view in the cup of the corolla which closely surrounds them, yellow, with darker yellow anthers. Stigmas 9 or 10, much shorter than the stamens and about 1 line long, subulate. Capsule 5-6 lines in diameter when closed, obconic, flattish-conical and with raised sutures on the top, with 9 or 10 valves and cells; valves reflexed when expanded, pallid within; expanding-keels closely contiguous for half their length then more or less diverging, dark brown, with broad, pallid, membranous marginal wings; cells roofed with membranous cell-wings, which in old cells become inrolled so as to appear as if incompletely covering the cells; no placental tubercle. Seeds nearly 1 line long, compressed-ovoid, microscopically tuberculate, dark brown.

Mesembryanthemum albinotum, Haw. in Phil. Mag., 1826, 126.

Nananthus albinotus, L. Bolus in S. Afr. Gard., 1927, 399, f. 21, F., and 400, f. 22, and 1928, 127, f. 7, and Notes on Mesemb. I, 63, f. 7, and 96, f. 21, F., and f. 22; N. E. Br. in Journ. Bot., 1928, 78. *Nananthus Comptonii*, L. Bol., Notes on Mesemb. II, 120. *Aloinopsis albinota*, Schwant., in Zeitschr. f. Sukk., 1926, 178.

Orange Free State: Near Harismith, Cooper 2395, without precise locality Leslie. Bloemfontein, Compton. Graeff Reinet, Luir.

Described partly from Haworth's description and a drawing of the type labelled "Raised in 1823 from Cape of Good Hope seed received from Mr. Bowie," and partly from the material above quoted, which quite accords with the figure of the type and Haworth's description.

I have not seen a specimen of *N. Comptonii*, but I cannot find any character in the description that will in any way distinguish it from *N. albinotus*, and as it comes from the same general area as the latter, I have little doubt that it is the same species. Bowie in all probability collected it in Graeff Reinet Division.

54

R. tersa, N. E. Br.-- Leaves about 6 to a growth, ascending-spreading and superposed in 4 rows, $1\frac{1}{2}$ - $1\frac{3}{4}$ inch long $2\frac{1}{2}$ -4 lines broad, and 3-4 $\frac{1}{2}$ lines thick near the apex, flat on the face and somewhat linear-lanceolate in form seen from above, acute, somewhat acutely keeled at the apical part on the back and the keel distinctly dilated near the apex, with the sides convex at the basal part and flattish or compressed at the apical part and flattish or compressed at the apical part, smooth but covered with microscopic points under a lens, glaucous-green, tinged with purple where exposed to the sun, thickly dotted with darker green, the dots not prominent. Pedicels 6-7 lines long, $1\frac{1}{2}$ - $1\frac{3}{4}$ lines thick below, thickened upwards, slightly compressed, bractless, smooth, glaucous-green. Calyx some-

54 what unequally 5-lobed down to the top of the ovary, coloured and dotted like the leaves, the longer lobes 5-6 lines long and the shorter 5-6 lines long, 2-3 lines broad, ovate, acute or sub-acute, recurved-spread, the outer keeled at the apex. Corolla 1 1/2-1 3/4 inch in diameter, extending about 2 p.m., and closing at night, scentless or nearly so; petals in 3 series, the outer recurved, the others spreading in different planes, 7-9 lines long, 1-line broad, linear, acute or obtuse not notched, bright, clear yellow on the upper face, deep pink on the back at the apical part. Stamens numerous, erect in a cylindric mass, 4-5 lines long, filaments and anthers yellow like the petals. Stigmas 8, overtopping the stamens, 2 lines long, filiform, recurved at the tips, pale green. Ovary shortly conical at the top. Fruit unknown.

Griqualand West: Near Kuruman, Pole Evans 7623.

Described from a living plant sent to me by Dr. Pole Evans, which flowered in September, 1923.

4. *R. Lesliei*, N. E. Br.-- Stemless, tufted, about 1-1 1/2 inch high. Leaves opposite, shortly united at the base, about two pairs to each growth when in flower, those of each pair unequal (always?), 9-10 lines long, 3-4 lines broad, at the basal part and 3-3 1/2 lines thick, suberect when received, but possibly sometimes spreading, flat above and then gradually tapering from the base to an acute point, obtusely keeled on the base one of each pair viewed sideways gradually tapering from base to apex, the other dilated at the keel near the apex and slightly incurved towards the smaller leaf so as to somewhat resemble a parrot's beak when open when the plant is at rest, green, suffused with purplish at the upper part, marked with slightly prominent dots, not at all glaucous. Flowers solitary, subsessile, on a pedicel 2-3 lines long that is quite hidden in the united bases of the leaves, with a pair of leaf-like bracts 3-4 lines long near its base. Calyx 5-lobed down to its union with the ovary; tube or ovary part obconic; lobes subequal, 2 1/2-3 lines long, 2-3 lines broad, broadly ovate, the outer 2 acute, the inner 3 obtuse, with a short dorsal point and with broad, membranous margins. Corolla only seen in a withered condition, probably 1 1/2 inch or more in diameter; petals numerous, free, about 6-7 lines long and 1-line broad, linear, obtuse, entire, apparently of a rich, deep orange. Stamens numerous, erect, not collected into a cone, 2-3 lines long; filaments and anthers bright yellow. Stigmas 10, about 1 line long, filiform. Ovary apparently flat on the top. Capsule (unripe) 5-lines in diameter, flat on the top.

Prange free State: On hills between Westminster and Clocolan, flowering in August and September. T. N. Leslie.

This distinct species was sent to me by Mr. T. N. Leslie. Upon arrival it had upon it an unripe fruit and a withered flower, that had probably expanded during its journey here, from these I have compiled the above description, as the plant has not flowered since.

5. *R. cibdela*, N. E. Br. -- Leaves about six to a growth, united at the base, ascending-spreading, 1 1/2-2 inches long, 3-3 1/2 lines broad, 2 lines thick, narrowly-lanceolate, acute, apiculate, flat or slightly concave on the face, rounded on the lower end keeled, and more or less compressed at the apical part of the back, dull cry-green, thickly marked with small, whitish pustules or raised dots. Flowers nearly sessile of very shortly pedicellate. Calyx conically obovoid below, subeally 5-lobed, whitish-dotted; lobes

54 about 3 lines long. Corolla 12-14 lines in diameter; petals in 1-2 series, 5-6 lines long, $\frac{1}{2}$ -line broad, somewhat lax, recurved, acute, yellow, without a red midline. Stamens in a cylindric mass about 2-2 $\frac{1}{2}$ lines high; filaments white, anthers yellow. Stigmas 10, erect, 3-3 $\frac{1}{2}$ lines long, filiform, longer than and recurving over the stamens. Fruit unknown.

Mesembryanthemum aloides, Salm Dyck, Mes. 4, f. 3, not of Haworth. *M. albiguttatum* var. *majus*, Haw., in Phil. Mag., 1826, LXVIII, 127. *M. ciliatum*, N. E. Br., in Journ. Bot. Soc. Bot., XIV, 64. *Aloinopsis ciliata*, Schwant. in Zeitschr. f. Sukk., 1926, 178.

South Africa. Locality and collector unknown, see note below.

This plant is only known to me from Salm Dyck's figure and description and a dried specimen of a plant of it cultivated at Kew many years ago, but of which I never saw flowers or made any noted.

Although Salm Dyck has erroneously figured this as being *M. aloides*, Haw., which is quite a different plant, there can be little doubt, I think, that he obtained it from Kew, and that it is probably one of the plants raised at Kew in 1823 from seeds collected by Bowie and named *M. albiguttatum* var. *majus* by Haworth, as above quoted, but of which he gave no description, for in vegetative characters Salm Dyck's figure quite agrees with the drawing Eiton had made of Haworth's type of that variety. The flower is not represented in that drawing.

6. *R. albipuncta* N. E. Br. -- Leaves many in a rosette, ascending-spreading, 9-12 lines long, 2 lines broad and $\frac{1}{2}$ line thick, semiterete at the lower part, keeled and trigonous at the apex, and fattish or slightly convex on the face, and in both front and side views tapering to an acute point, greyish-green, thickly marked with small, whitish dots or pustules. Flowers solitary, sessile or nearly so. Calyx not described nor figured. Corolla about 14 lines in diameter; petals numerous, in 1-2 series, lax, recurved-spreading, very narrowly linear, $\frac{1}{4}$ -1.3 line broad, acute, yellow. Stamens numerous, erect in a cylindric mass, represented as yellow. Stigmas not represented so probably shorter than the stamens.

Mesembryanthemum albipunctum, Haw., in Phil. Mag., 1826, LXVIII, 126. *Nananthus albipunctus*, N. E. Br., in Journ. Bot., 1928, 78. *Aloinopsis albipuncta*, Schwant. in Zeitschr. f. Sukk., 1926, 178.

South Africa, without precise locality, Bowie.

Described partly from Haworth's original description and partly from Haworth's original description and partly from a drawing of the type plant labelled "Raised in 1823 from seeds of Good Hope seeds received from Mr. Bowie."

The above is all that is known of this plant as Mrs. Bolus's identification of *M. albipunctum*, Haw., is entirely wrong.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 89: 92. 1931.

(Continued from page 54.)

NANANTHUS, N. E. Br.

Stemless, succulent perennials, with a fleshy rootstock, becoming divided into short branches at the top. Leaves opposite, united at the base, arranged in dense rosettes of 3-5 pairs to a growth, lanceolate, linear-lanceolate or ovate, acute, flat or slightly concave on the face, often uncurved at the tip, keeled on the back, often uncurved at the apical part, covered with slightly raised dots or small pustules which are often whitish. Flowers solitary by the side of a new growth and so appearing axillary, subsessile or very shortly pedicellate, expanding in daytime. Calyx subequally 5-lobed down to its union with the ovary, some of the lobes with membranous margins. Petals numerous, free, in two series, all closely imbricating and widely spreading in one plane. Stamens numerous, collected into a broad cone which is completely exposed to view to its base. Stigmas 7-10, filiform, nearly or quite as long as the stamens. Ovary inferior, flattish or slightly convex on the top, with 7-10 rather shallow cells; placentas on the floor or outer wall of the cells. Capsule half-globose, slightly convex or flattish-convex on the top, the sutures slightly raised to as to form a very short central cone, with 7-10 valves and cells; expanding-keels either contiguous, except at the tips, and adnate for all their length and nearly as long as the valves, with broad marginal membranous wings that are not united in pairs between the valves, or diverging from their base, not half as long as the valve, but produced into free awns reaching nearly to the tips of the valves without marginal wings; cells open, without or with rudimentary cell-wings that stand quite erect back to back, and without a placental tubercle. Seeds either flat and thin, or almost winged, somewhat half-moon-shaped and smooth, or subglobose with a small point and microscopically tuberculate.-- N. E. Br., in the *Gardeners' Chronicle*, 1925, LXXVIII, 473. *Aloinopsis*, Schwantes, in *Zeitschr. f. Sukk.*, II, 177, and see N. E. Br. in *Journ. Bot.*, 1926, 75.

A small genus of about 5 species, native of South Africa, the type being *N. vitatus*, N. E. Br.

The name is derived from the Greek, nanos, dwarf, and anthos, a flower, in allusion to the dwarf nature of these plants.

In *South African Gardening*, 1929, p. 24, an attempt has been made to uphold the generic name *Aloinopsis*, Schwantes, and a confused and incomplete account of it given without descriptions of or keys to the species, without citations and with illustrations that are incorrectly names, and an application of the name *Nananthus* in a sense the author of that genus never intended or indicated. It is much to be regretted that the article upon this group of plants published in South Africa and elsewhere should cause so much confusion. They exhibit for the first time in the history of botany a deliberate departure from the code of etiquette that has hitherto been maintained and respected by all scientists, a code that demands an unusually great freedom to systematically anticipate the work of a monographer or other worker for the purpose of claiming priority of authorship.

The upholding of *Aloinopsis* is contrary to all rules of nomenclature, for it has been clearly and demonstrated in the *Journal of Botany*, 1927, p. 71, that *Aloinopsis* is an invalid genus, because:-- (1) It was founded by Schwantes in *Zeitschr. f. Sukk.*, 1926, p. 177, upon the very same plants of those named the same genus as had previously been founded. (2) The generic name was applied to the fruit of a plant not belonging to any plant mentioned by Schwantes as belonging to the genus. (3) The species (*Mesemb. rosulatum*,

92 Kensit) that he afterwards states (Zeitschr. f. Sukk., 1927, p. 105) is the type of the genus *Aloinopsis* and from which he states the fruit - characters are described (see Zeitschr. f. Sukk., 1926, p. 178, under *Titanopsis*), I have every reason to believe is a plant that at that time he had never seen. And as, according to his own statement, the fruit he describes as being that of *Aloinopsis rosulata* was a detached capsule sent to him from South Africa by a distinguished South African botanist as being the fruit of *Mesembryanthemum Bolusii*, it is evident that the supposition that that capsule was the fruit of *M. rosulatum* was evolved entirely from a vivid imagination, and is not a scientific method of founding a genus. According to the description given by Schwantes, the fruit in question would appear to belong to some species of *Punctillaris*. Therefore, as the generic description of *Aloinopsis* does not accord with the structure of any known plant, and all the plants mentioned as belonging to it, with one exception, are the very same as those on which the genus *Nananthus* was founded, it follows that *Aloinopsis* cannot be maintained as a genus. And besides the above, it is evident that the name *Aloinopsis* (meaning Aloe-like) was intended to be applied to *M. Aloides* and its allies, which have a slight Aloe-like appearance, while *M. rosulatum* more nearly resembles a Daisy, and it appears evident that but for the possession of a fruit wrongly supposed to belong to *M. rosulatum*, that *M. aloides* or some allied species would have been selected as the type of the genus, but of these I believe Schwantes had not seen fruits.

The species of this genus are difficult to distinguish by means of words, as the flowers all except *N. aloides* are alike, and the vegetative differences are not easy to portray in words.

Key to the Species.

Leaves 1-2 inches long, 4-10 lines broad, lanceolate or rhomboid-lanceolate, acute.

Petals yellow, with a somewhat inconspicuous darker yellow
midline. 3. *aloides*.

Petals yellow, with a very conspicuous bright red midline
on both sides. 4. *rubrolineatus*.

Leaves $\frac{1}{2}$ -1 $\frac{1}{2}$ inch long, 2-4 lines broad; corolla about
1 inch in diameter; petals with a bright red midline
on both sides.

Leaves under natural conditions 6-10 lines long, ovate
or ovate-lanceolate and broadest at the middle, but
under cultivation becoming 10-20 lines long and linear-
lanceolate, or with parallel sides to the middle then
tapering to an acute apex. 1. *vittatus*.

Leaves 1-1 $\frac{1}{2}$ inch long, slightly spathulate-lanceolate,
somewhat dilated above the middle, where they are 3 $\frac{1}{2}$ -4 $\frac{1}{2}$ line
broad and narrowing to the base, or with parallel sides
below the dilated part. 2. *Pole Evansii*.

1. *N. vittatus*, N. E. Br., in Journ. Bot., 1928, 78-- (see

92 Figs. 48 and 49).-- Leaves changeable in form, those of native-crown plants 4-10 to a broad, ascending or ascending-spread and usually ovate or ovate-lanceolate, acute or sub-acute, 6-10 lines long, 2 $\frac{1}{2}$ -5 lines broad at the middle, and sometimes with one side more bulging than the other, 2-2 $\frac{1}{2}$ lines thick, flat or slightly concave on the face, rounded on the back at the basal part and keeled at the apical part, and the keel compressed and slightly dilated, so that in side view it is truncately rounded into the apicula and is also sometimes oblique. Under cultivation these leaves change to others that are 10-20 lines long, 1-3 lines broad and 1-2 lines thick, linear or linear-lanceolate, tapering from about the middle to an acute point, mucronate, flat on the face, rounded on the back, except at the apex where they are slightly keeled, and in side view with the keel gradually (not abruptly) rounded or narrowed into the apex; all forms of leaf glabrous and slightly rough from being covered with raised dots or small pustules, dull grey-green or whitish, according to sun exposure. Pedicels 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ lines long. Calyx lobes 3-4 lines long, 2 $\frac{1}{2}$ lines broad, deltoid-ovate, acute, prominently dotted. Corolla about an inch in diameter; petals all spreading in one plane, 4-4 $\frac{1}{2}$ lines long, subacute obtuse, yellow, shining, paler on the back, with a bright red line down the middle on both sides. Stamens collected into a broad cone 2-2 $\frac{1}{2}$ lines long, white, with yellowish anthers. Stigmas 7-10, erect, with recurved tips, compressed-subulate. Ovary slightly convex on the top. Capsule 3-4 lines in diameter when closed, hemispherical below, slightly convex on the top. Capsule with 7-10 valves and cells, and entirely pallid within; expanding-keels nearly as long as the valve, continuous into a central keel throughout their length except at the tips, and having broad marginil wings; cells open, without or with rudimentary cell-wings standing rect, back to back; no placental tubercle. Seeds 2/3-line long, flattish and thin, somewhat elliptic in outline, with a point, smooth, pale brown on one half and darker brown on the other part.

Mesembryanthemum vittatum, N. E. Br., in Gard. Chron., 1876, VI, 772, and in Burtt Davy's Fl. Transv. I, 160, 162; L. Bol. in S. Afr. Gard., 1928, 127, f. 6, and Notes on Mesemb. I, 63. *M. transvaalense*, Rolfe in Bot. Beech. t. 8874, a poor figure. *Aloinopsis vittata*, Schwant., in Zeitschr. f. Sukk. 1926, 178; L. Bol. in S. Afr. Gard. 1929, 241, with fig.

Orange Free State: Fauresmith District, 4,600 feet alt, near the Vaal River, Smith 4391 on the Fauresmith Botanical Reserve, Smith 4405, and at Jagersfontein, Smith 5235. Transvaal: Smithskraal, Boshof District, Burtt Davy, Hamans Kraal, Hutchinson.

This species was originally described from a living plant sent to Kew without information as to locality between 1873 and 1878, by Mr. H. Hutton, whom at that time lived at Bedford in South Africa, and he used occasionally to make a journey to the Diamond Field, he probably obtained it during one of those journeys.

M. vittatus under cultivation in Europe is quite unlike the same plant in a wild state, as the short ovate leaves represented at Fig. 48, which if from a photograph taken by Mr. C. A. Smith of a Fauresmith plant, change into others that are longer and narrower, and linear-lanceolate in form. The Hamans Kraal plant above quoted, when received at Kew in 1928, had leaves like those represented at Fig. 48, but twelve months after introduction it began to change the form of its leaves, both the original ovate leaves and the new

93 linear-lanceolate leaves being present on the plant at the same time, he represented in the reproduced photograph (Fig. 49).

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 89: 133. 1931.

(Continued from page 93.)

NANANTHUS.

133

2. *N. Pole Evansii*, N. E. Br.-- (Figs. 64, 65 and 66).--

Leaves 6-10 to a growth, spreading, or ascending-spreading, 1-1 $\frac{1}{2}$ inch long, 2-4 $\frac{1}{2}$ lines broad at the dilated part above the middle, 1 $\frac{1}{2}$ -3 lines thick, usually somewhat spatulate-lanceolate as seen above, with parallel sides below the dilated part, or sometimes not dilated above the middle, acute, flat above, rounded on the back at the basal part and keeled at the apical part, and in side view the keel is truncately rounded into the apex, greyish-green, thickly marked with slightly elevated, pallid green or whitish (or in the absence of sun, dark green) dots or pustules, and on native grown plants slightly velvety to the touch from being covered with soft, microscopic points, which under some conditions of cultivation disappear. Flowers odourless, sessile or nearly so. Calyx-lobes about 5 lines long, ovate, acute, pustulate like the leaves. Corolla 10-11 lines in diameter, opening about midday and closing between 5 and 6 p.m.; petals in two closely imbricating series, widely spreading in one plane, 3-4 lines long, 4-line broad, obtuse, light yellow, with a bright red midline on both sides, shining. Stamens in a yellowish- or creamy-white anthers; filaments bearded at the base. Stigmas 7-10, erect, filiform, slightly longer than the stamens, green. Capsule when closed 4-5 $\frac{1}{2}$ lines in diameter, half-globose, 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ lines deep, flattish-conical, with slightly elevated sutures on the top, and with 7-10 valves and cells, pale brown, dotted with darker brown outside, pale ochreous within; expanding-keels nearly as long as the valves and closely contiguous except just at the tips, and with broad, membranous, colourless marginal wings obtusely rounded at the apex; cells without or with very rudimentary cell-wings that stand erect, back to back, and without a placental tubercle. Seeds 3/4 to nearly 1 line long and 2/3 line broad, flat and thin, somewhat half-moon-shaped, almost winged on the curved side, with a short, oblique point at one end, smooth, light brown.

Prieska Division: At Zand Vlei, Pole Evans, 6440, the type.

Griqualand West: between Kuruman and Takoon, Mogg.

Described from living plants sent to me by Dr. I. B. Pole, Evans.

3. *N. aloides*, N. E. Br.-- (Figs. 67, 68 and 69).-- Leaves 6-8 to a growth, spreading in a rosette, 1 inch to 2 inches long, 4-7 lines broad and 2-3 $\frac{1}{2}$ lines thick, lanceolate or rhomboid-lanceolate, often oblique, acute, flat or slightly concave above, keeled at the apical part and rounded at the basal part on the back, grey-green or dull green, thickly marked all over with slightly prominent, whitish dots or pustules, which become green unless fully exposed to sunlight. Flowers sessile or nearly so. Calyx somewhat

- 133 unequally 5-lobed, rustulate like the leaves; lobes 3-4 lines long, acute or acuminate, the inner with narrow, membranous margins. Corolla 1-1½ inch in diameter petals in two series, imbricating in one plane and recurving, 5-6 lines long, ½-- line broad, linear, sub-acute, or tapering from the middle to a sub-acute point, light yellow, with a slightly darker yellow (not red) midline and sometimes tinged with red at the tips. Stamens collected into a broad cone, white. Stigmas 10, filiform, finally exceeding the stamens.

Mesembryanthemum aloides, Haw. Suppl., 38, and Rev., 87; Burchell, Trav., I, 332; N. E. Br. in Journ. Linn. Soc. Bot., XLV, 123; Pole Evans, Fl. Pl. S. Afr., II, t. 54, not of other authors. *Aloinopsis aloides*, Schwant., in Zeitschr. f. Sukk., 1926, 178.

Bechuanaland: At Matloing River, Burchell, 2197, and Sabiru Fontein, Near Takun, Bruchell 2249-8; near Postmasburg, Pole Evans 7584.

The above description is chiefly compiled from a drawing of the type plant at Kew, labelled:-- "*M. aloides*, Haw. Received from Mr. Haworth in the year 1822, who obtained it from Mr. Burchell," and from Haworth's description, with a few details added from the Postmasburg plant. According to his 1833. lists, Burchell collected seeds only of 2197, but of 2249-8 seeds and a dried specimen were collected, and according to a list of his collection at Kew this particular number was treated as a duplicate and is probably in the J. E. Gray Herbarium at Harvard University, Cambridge, Massachusetts, United States.

Plant has not yet been found in the localities where Burchell collected it, but Dr. Pole Evans found what I believe to be the same species near Postmasburg, and which is represented from Fig. 89 from a photograph by Mr. T. N. Leslie. This plant quite accords with the beautiful drawing of the type at Kew, except that its leaves are rather larger on well-grown plants than represented in the original drawing, where they are not more than 1½ inch long and 4-5 lines broad, but when first sent to me the leaves of the Postmasburg plant were scarcely larger and as represented in Fig. 87 which is made from a wild plant. The petals in the drawing as seen with a lens are subacute and red at the tips, and on a few of them a slender line of darker yellow (not red) down the centre of each can be clearly discerned, but is not represented on the majority of the petals, which, from the "high light" upon them are evidently shining. I have seen the flower of the Postmasburg plant and have no recollection of having seen a distinct red line on its petals such as occurs in *N. rubrolineatus*, nor is a red line represented in the coloured figure of this plant in Fl. Pl. S. Afr., II, t. 54, and in the description accompanying it they are stated to be lemon-yellow without any mention of a red midline. Yet, as photographs (for I have another made from my own plant) represent a darker midline, in all probability there is a slightly darker yellow (not red) midline as is represented in the original drawing at Kew, and which is unnoticeable to the eye, but which the camera easily detects. I give this details because Mrs. Bolus has also reproduced in S. Afr. Gard., 1930, p. 48, this same photograph of Mr. Leslie's with the name *Aloinopsis aloides* var. *striata*, L. Bol., attached to it, without a description. Yet when we analyse the account given with it, we find that the name is actually based upon what is evidently an entirely different species, for Mrs. Bolus states that Mr. Leslie's with the name *Aloinopsis aloides* attached to it, without a description. Yet when we analyse the account given with it, we

134 find that the name is actually based upon what is evidently an entirely different species, for Mrs. Bolus states that Mr. Leslie's photograph represents a plant that "appears to be the same as one sent from Bultfontein and Boetsap in Borkly West, the only difference being that the leaves are shorter and more like those of Burchell's plant as represented in the unpublished drawing at Kew. But the flowers are larger and the petals are banded with red." So that as Mr. Leslie's photograph only "appears" to be the same and yet has characters that are stated to be different, and as the plant comes from another locality, it is in all probability quite distinct from the plant to which Mrs. Bolus intends the varietal name "striata" to apply. Therefore, until plants collected at one or other of the localities where Burchell found it have been compared both with the Postmasburg plant and demonstrate that the latter is distinct, I deem it best to treat it as I have here done.

4. *N. rubrolineatus*, N. E. Br., in Journ. Bot., 1928, 78.-- (Fig. 70).-- Rosettes or growths 2-3 inches in diameter, composed of 6-8 spreading leaves, 1 inch to 2 inches long, $4\frac{1}{2}$ -10 lines broad, 2-4 lines thick, somewhat softly fleshy, often scabrous to or lenticulate, acute, flat on the face, obtusely keeled at the apical part on the back, glabrous, greyish-green or tinted with brown or purplish, thickly covered with slightly raised, whitish dots pustules. Pedicel 2-4 lines long, 2 lines thick. Calyx-lobes 4-5 lines long, deltoid-ovate, obtusely pointed, dull green with small, whitish pustules. Corolla 15-16 lines in diameter, expanding before 11 a.m. and closing about 4 p.m.; petals in 2 series, imbricating and all spreading from the base in one plane, 6-7 lines long, $1\frac{1}{2}$ line broad, entire, acute, yellow, with a red line down the middle on both sides. Stamens collected into a cone about 3 lines long, yellow. Stigmas 10, filiform, 2 lines long, about equalling the staminal cone, pale greenish. Capsule 5-6 lines in diameter when closed, hemispherical, slightly convex above and with raised sutures to the 10 valves, which are pallid within; keels diverging from the base and the adnate part about half as long as the valve, brown, but produced into a pallid awn nearly as long as the valve, not winged; cells open, with the cell wings standing erect, back to back, and at the outer part about 1-line high, pallid. Seeds about 1-line long, globose-ovoid, with a point, microscopically tuberculate, dark brown.

Mesembryanthemum rubrolineatum, N. E. Br., in New Bull., 1911, 92, not of Marloth. *Alcinopsis rubrolineata*, Schwant., in Zeitschr. f. Sukk., 1926, 178. *A. Dyeri*, L. Bol. in S. Afr. Gard., 1929, 244, with fig.

Grassf Reinnet Division: Hendrew, Dyer,. Described from a living plant sent by Mr. C. J. Howlett, from Grassf Reinnet, where it was cultivated, to Kew, in 1908.

I am indebted to Mr. R. A. Dyer for a living plant of *Alcinopsis Dyeri*, L. Bolus, and find it identical with the well-known *N. rubrolineatus*,.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 89: 259. 1931.
(Continued from page 134.)

DEILANTHE, N. E. Br.

Perennial, stemless or nearly so. Rootstock thick and firmly fleshy, deeply rooting, sometimes with short branches at the top without internodes. Leaves opposite, united at the base, in rosettes, spatulate-ovate or spatulate-lanceolate, lottless, velvety-puberulous. Flowers solitary, pedicellate, bracteate at the base of the pedicel. Calyx subequally 5-lobed down to its union with the ovary. Corolla expanding in the evening; petals numerous, free, in 3 or 4 series. Stamens numerous, erect, in a loose cylindrical mass. Glands connected into a crenulate ring. Stigmas 10-13, erect, subulate. Ovary inferior, flattish, or slightly convex on the top, placentas on the floor or outer wall of the cells. Capsule inferior, shortly obconic, flattish at the top, with raised sutures and with 10-13 valves and cells; valves narrowly deltoid, with a very prominent, acute keel on the inner face; expanding-keels diverging from the base, about half as long as the valve, each tipped with a pallid awn reaching nearly to the tips of the valves, and with short, broad, membranous marginal wings at the basal part that are united in pairs between the valves; cells acutely roofed with rather stiff cell-wings and without a placental tubercle. Seeds Pear-shaped, smooth.

A monotypic genus, native of South Africa.

The name is derived from the Greek, *deile*, evening, and *anthe*, a flower, in allusion to flowers commencing to open in the evening.

This genus is recognisable at sight by its stemless habit and flattened, velvety-puberulous, whitish-green leaves, which spread rather widely.

1. *D. Peersii*, N. E. Br. (Figs. 127 and 128).-- Rootstock usually more or less divided, yet scarcely forming branches under natural conditions, but under cultivation forming short branches without distinct internodes. Leaves on native-ground plant usually in 1 or 2 pairs to a growth but under cultivation forming 2-4 pairs to a growth, spreading, 9-18 lines long, 5-8 lines broad above the middle and $2\frac{1}{2}$ - $3\frac{1}{2}$ lines thick, spatulate-lanceolate or spatulate-obate, obtusely pointed, not apiculate, flat on the face, convex, and with a blunt keel on the back, minutely velvety-puberulous, without dots, somewhat whitish-green, or with a bluish tint, not shining. Flowers solitary. Pedicels 6-10 lines long, with a pair of bracts about 3 lines long at the base, velvety-puberulous. Calyx velvety-puberulous; lobes 2-5 lines long, $2-3\frac{1}{2}$ lines broad, deltoid-ovate, acute or obtuse. Corolla 12-18 lines in diameter, expanding about 5 p.m. and remaining open during most of the night, slightly fragrant; petals about 40, in 3 or 4 series, 4-6 lines long, $\frac{1}{2}$ -1 line broad, linear, obtuse or bluntly pointed, sometimes minutely and irregularly toothed at the apex, clear yellow on both sides, or, according to Mrs. Bolus, dull reddish-yellow, paler at the base. Stamens about 4 lines long, with orange-yellow filaments, bearded at the base, and with cream-coloured anthers. Stigmas about $1\frac{1}{2}$ line long, subulate, erect, green. Capsule as described under the genus, 6-8 lines in diameter when closed, ocreous within, with brown expanding-keels. Seeds $\frac{1}{2}$ line long, smooth, pale brown, with a dark brown point.

Nananthus Peersii, L. Bol., in Ann. Bol. Herb., IV, 104.

Aloinopsis Peersii, L. Bol., in S. Afr. Gard., 245 and 288, with fig. *Mesembryanthemum canum*, Berger, in Botizblatt Bot. Gart. Berl., IV, 248, and Mes., und Port., 299; Karloth in Deutsch Tiefsee Exped. II, t. 3, 337, not of Haworth.

259 Laingsburg Division: Near Matjesfontein, Austin, Prince
 Albert Division: Karoo, Mrs. D. van der Bijl, 69. near Klaars-
 trrom, Mrs. D. van der Bijl. Willowmore Division: near Willowmore,
 Fole Evans, Miller, Marloth.
 H. T. Brown
 (To be continued.)

MESEMBRYANTHEUM.
 Gard. Chron. III. 89: 279. 1931.
 (Continued from page 259.)

KHADIA, N. E. Br.

279 Very dwarf, perennial Succulents, tufted, with numerous very short branches arising from a fleshy rootstock. Leaves opposite, united at the base, crowded, semiterete below, trigonous at the tips, smooth, pellucid-dotted. Flowers solitary, pedicellate. Calyx 5-lobed; inner lobes with membranous margins. Corolla with numerous free petals. Staminodes numerous in 3 or 4 series, filiform, recurving. Stamens numerous, the outer spreading and often with white, barren anthers. Stigmas 6-10, subulate or filiform, acute,. Ovary inferior, with 6-10 cells; placentas on the outer wall of the cells. Capsule shortly and broadly obconic, convex and with 6-10 raised and gaping sutural ridges on the top; valves with (always?) a central acute keel; expanding-keels about half as long as the valves, diverging from the base and without wings or awns; cells somewhat acutely roofed with stiffish cell-wings, and with or without small placental tubercles. Seeds slightly compressed-Pear-shaped, minutely or microscopically tuberculate. Species about three or four, all natives of the Transaal region. The name is given because the root is stated to be used by natives for making a drink called "Khadi." I regret that no material is available for illustrating this genus.

Key to the Species.

Stigmas, and valves and cells of the fruit 8-10.

Leaves in side view somewhat abruptly tapering into the point from a little below the apex; pedicels 2½-4 lines long; calyx-lobes 3-5 lines long, broadly ovate; stigmas erect; cells of fruit without placental tubercles; seeds 9-17 in a cells, ½-line long. 1. acutipetala.

Leaves in side view abruptly rounded into the point; pedicels 9 lines long; the longer calyx-lobes 5-6 lines long, leaflike; stigmas ascending or erect; fruit unknown. 4. Nationae.

Stigmas, and valve and cells of the fruit 6; pedicels 2-4 lines long; the two longer calyx-lobes 5-7 lines long, leaflike.

Leaves inside view somewhat abruptly tapering to the point from a little below the apex; stigmas erect or ascending, with recurved tips; cells of fruit with a small placental tubercle; seeds about 5 or 6 in a cell, ¼ line

Leaves in side view gradually tapering to the acute apex; stigmas radiating.

3. *Nelsoni*.

1. *K. acutipetala*, N. E. Br.-- Plant $1\frac{1}{2}$ - $2\frac{1}{2}$ inches high, with crowded branches 2-12 lines long, arising from a fleshy, divided rootstock, glabrous. Leaves 2- to a growth, crowded, shortly united at the base, erect or ascending, 6-14 lines long, 2-3 lines broad and $1\frac{1}{2}$ -2 lines thick at the basal part, thence (in face view) gradually tapering to an acute and mucronate apex, flat on the face, convex on the back at the basal part and keeled at the apical part, (not rounded into) the point from a little below the apex, smooth, greyish-green or slightly glaucous, pellucid-dotted, and with the base on living plants cartilaginous or papery and becoming cartilaginous edges. Pedicels $2\frac{1}{2}$ -4 lines long. Calyx-lobes 3-5 lines long, broadly ovate, acute or obtuse. Corolla about 11 lines in diameter; petals numerous in 3 or 4 series, linear, acute; the inner smaller and gradually passing into 3 or 4 series of filiform, recurved stamens, bright rose-purple. Stamens numerous, the outer spreading, 2-4 lines long; filaments rose-purple; anthers yellow. Stigmas 8-10 (not 9 or 8 as originally described), about 2 lines long, erect, with recurved tips, tubulate, acute. Capsule as described under the genus, 5-6 lines in diameter when closed, with 8-10 valves and cells, and, when clean and fresh, bright ochreous-brown on the outside and ochreous within, becoming dark brown or fuscous with age; cells without placental tubercles. Seeds 9-17 in a cell, $\frac{1}{2}$ line long, somewhat compressed-Pear-shaped, microscopically tuberculate, ochreous.

Mesembryanthemum acutipetalum, N. E. Br., in Kew Bull. Misc. Inf., 1908, 407.

Transvaal. Near Johannesburg, Turner, Moss.

2. *K. Beswickii*, N. E. Br.-- Plant closely resembling *K. acutipetala* in habit, vegetative characters and flower, but with pale rose-coloured petals fading into white at the base. Stigmas 8, erect or ascending, about 2 lines long. Capsule like that of *K. acutipetala*, but with only 6 valves and cells, and the cells with a small and rather obscure placental tubercle. Seeds about 5 or 6 in a cell, a lens distinctly but minutely tuberculate, the tubercles being larger and more easily seen than those on *K. acutipetala*, brown.

Mesembryanthemum Beswickii, L. Bol., in Ann. Bot. Herb., III, 124.

Transvaal: Near Johannesburg, Moss. Ross Frames in Herb. Bolus, 17256.

Dried specimens of this plant in flower only cannot be distinguished from *K. acutipetala* without dissecting the flowers, but the in fruit the number of valves of the capsule easily distinguishes it. I have not been able to compare living flowers of the two species, so cannot state if the colour distinction is constant, but the difference in the number of valves to the capsule and the size and number of seeds in a cell is quite constant in the numerous capsules examined, and which were attached to living and dead plants kindly sent to me by Professor C. E. Moss.

According to the original description, this plant differs from

279 *K. acutipetala* "by the 6-ported flowers" and in Latin "6-merous". Other species are described as having "4-merous" or "5-merous" flowers, but no known member of the whole group of *Mesembryanthema* has flowers that are either 5-, 5- or 6-merous.

3. *K. Nelsoni*, N. E. Br.-- Very similar to *K. acutipetala* in general appearance, but with more elongated growths and with longer leaves, which are 1-1½ inch long on the dried specimen, and in side view gradually taper to the acute apex. Calyx very unequally 5-lobed, the longer lobes 6-7 lines long, leaf-like. Stigmas 6, radiating, 3-3½ lines long.

Transvaal: Witte Koppies, and near Boksburg, Nelson.

I have seen only one plant of this, which was sent to me by the late Mr. W. Nelson, and having unfortunately omitted to make my customary notes of it before it died, I can give no further particulars of it! Mr. Nelson considered it quite distinct from *K. acutipetala*, and wrote concerning it:-- "This will stand more generous soil and more water than *K. acutipetalum* would. It grows here (near Boksburg and at Witkopjes, in Witwatersrand district) in a strong, greasy, loam-country, so you need not fear to treat it liberally. *K. acutipetalum* grows on the dry stony outcrop-country and its locality is south and west of Johannesburg, in Witwatersrand district." From memory, I think. Mr. Nelson informed me that the flowers of this plant were crimson in colour.

4. *K. Nationae*, N. E. Br.-- Plant 2-3½ inches high when in flower. Leaves 1-1½ inch long, 1½-2½ lines broad on dried specimens, so perhaps rather larger when alive, tapering gradually from the base in face view, and in side view abruptly rounded into the apex. Pedicels about 9 lines long. Calyx unequally 5-lobed, three of the lobes 5-6 lines long, leaf-like, the other two shorter and obtuse, with a dorsal point and broad membranous margins. Corolla an inch or more in diameter; petals 5 lines or more long, ½ line or less broad, apparently rosy or purple. Staminodes filiform, rosy or purple, and the filaments of the stamens probably of the same colour. Stigmas 8, ascending, 1½ line long, stoutly filiform, acute, probably prplish.

Mesembryanthemum Nationae, N. E. Br., in Burt Davy's Fl. Transv. I, 161, 162.

Transvaal: Near Rustenburg probably, Nation.

This appears to differ from *K. acutipetala* and *K. Beswickii* by its longer leaves that are abruptly rounded into the point in side view, longer pedicel, and the longer calyx-lobes being very leaf-like.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 89: 294. 1931.

(Continued from page 279.)

PERISSOLOEUS, N. E. Br.

294 Perennial Succulent, very dwarf, forming large clumps; branches short and very stout. Leaves opposite, densely crowded in 2-3 living

294 pairs and numerous dead ones to a growth, forming dense clusters, ascending, shortly united at the base, trigonous, acute, with acute edges and keel, smooth and glabrous. Flowers solitary, terminal, pedicellate, with a pair of small leaves at the base of the pedicel. Calyx subequally 8-lobed down to its union with the ovary. Corolla only seen in an undeveloped bud and not properly determinable, but the petals appeared to be united, yet may not be so when fully developed. Stamens very numerous, erect, not collected into a cone; filaments not bearded at the base. Stigmas 7 or 8, subulate, depressions at the top, and slightly 7 or 8-grooved, or floor of the cells. Capsule obconic below, flattish, with 7 or 8 much raised and gaping valves on the top, and with 7-8 valves and cells; valves spreading when expanded, and together with the whole inside of the capsule brown; expanding-keels narrowly diverging from the base, much raised, thin, with minutely toothed, acute edges, and produced into straight awns extending to the tip of the valve, and furnished below the awns with irregularly toothed marginal wings; cells somewhat acutely roofed with membranous cell-wings, and with a small placental tubercle that scarcely forms any obstruction at the opening. Seeds not seen.

A monotypic genus, native of South Africa.

The name is derived from the Greek, perissos, exceeding in number, and lobos, a lobe, because the calyx is 8-lobed, the only member of the whole group known to me to have constantly so many calyx-lobes.

1. *P. Bijlii*, N. E. Br.-- Plant and leaves as described for the genus. Leaves 9-12 lines long, 4-6 lines broad and 4-5 lines thick, flat on the face, acutely keeled on the back with sharp edges and keel which is often slightly oblique, and one side flattish or slightly concave and the other very slightly convex, rather light green, with the edges often purplish, not dotted, either pellucidly or otherwise. Pedicels 4-6 lines long. Calyx subequally 8-lobed; lobes 4-5 lines long, 2-3 lines broad, ovate, acute, keeled, some with membranous margins. Flower as described under the genus. Stamen s with white filaments and rich yellow anther. Stigmas greenish. Capsule 4½-5 lines in diameter when closed, and as described for the genus.

Somerset East Division, locality not specified, Mrs. D. van der Bijl, 93.

I regret that I cannot be present give a more complete account of the flower of this interesting and very distinct plant, which differs from all others of this group known to me by having an eight-lobed calyx, and by that character should be easily recognised. The appearance of the plant, too, with a mass of hard and rigid dead leaves under the living ones is unusual.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 89: 389. 1931.

(Continued from page 295.)

PREPODESMA, N. E. Br.

389

Perennial, stemless Succulent, with a fleshy rootstock.

Leaves opposite, in 2-4 pairs to a growth, crowded, fleshy, trigon-

389 ous, keeled, smooth, with immersed dark green dots, and usually velvety to the touch from being covered with microscopic points. Flowers solitary, terminal, pedicellate. Calyx subequally 5-lobed down to its union with the ovary. Petals in 3 or 4 series, free, linear, laxly arranged. Stamens numerous, erect in a cylindric column-- that is, prominent and conspicuous to its base-- the inner slightly bearded at the base; no staminodes,. Stigmas 5 or 6, erect, filiform. Ovary inferior, shortly conical and with sutural ridges on the top, 5 or 6-celled, with the placentas on the outer wall. Fruit not seen.

Species about 2, natives of South Africa. The type of the genus is *P. Orpenii*, N. E. Br.

The name is derived from the Greek, *prepo*, to be conspicuous, and *desme*, a bundle, because the stamens form a bundle conspicuous to the base.

Leaves slightly velvety to the touch. Pedicels 4-6 lines long. Petals not incurved-hooked at the tips.

1. *Orpenii*.

Leaves glabrous, smooth. Pedicels 12-15 lines long.

Petals incurved-hooked at the tips.

2. *uncipetala*.

1. *P. Orpenii*, N. E. Br. (Fig. 195).-- Plant stemless, about 1½ inch high when in flower. Leaves about eight to a growth, ascending-spreading, ½-1¼ inch long, 2½-3½ lines broad and 3-3½ lines thick, with parallel sides broad and nearly to the apex, then abruptly acute, flat on the face, rounded at the basal part and keeled, and the keel slightly dilated at the apical part on the back, acute, mucronate; surface smooth and slightly velvety to the touch from being covered with microscopic points, dull glaucous-green tinted with dull purple or brown thickly marked with dark green dots that are not at all prominent. Flower solitary, terminal. Pedicels 4-6 lines long, 1½ line thick, terete, tinted with reddish. Calyx-lobed recurved, 3-4½ lines long, 2-3 lines broad, ovate, obtuse or subacute, dull dark green or purplish-brown, with darker dots. Corolla 1½-1¾ inch in diameter, opening between 3 p.m. and 4 p.m., and closing at sunset, faintly scented; petals numerous, in about 3 or 4 series, 8½-9 lines long, 1-2 line broad, linear, acute or obtuse, the outer series reflexed, the inner series slightly ascending-spreading or subhorizontal, and the others spreading at intermediate angles, all bright, clear yellow and shining on the inner face, whitish-yellow on the back. Stamens in a cylindric mass 4-5 lines long, filaments slightly bearded and white at the basal part and microscopically rough and yellow at the upper part; anthers yellow. Stigmas 5 or 6, about 4 lines long, erect, with their tips curving upwards or over the anthers, filiform, slightly plumose at the base, pale yellow.

Mesembryanthemum Orpenii, N. E. Br. in Gard. Chron., 1921, LXX, 603, f. 133. *Aloinopsis Orpenii*, L. Bol. in S. Afr. Gard., 1929, 288, with fig.

Griqualand West: Near Campbell, Orpen.

The above description was made in July, 1921, from a living plant sent to me under number 6010, by Dr. I. S. Pale, Evans, the having been collected by Mr. Orpen, to whom I have dedicated it.

2. *P. uncipetala*, N. E. Br. (Fig. 196).-- Plant stemless, about

389 2½-3 inches high when in flower. Leaves in 4-6 pairs to each growth, crowded, spreading, 1½-2½ inches long, 3-4 lines broad at the base, thence gradually tapering in a straight line to the apex, 2½-3 lines thick and rounded on the back at the base, compressed, keeled, and the keel dilated to 4-4½ lines thick near the apex, flat on the face, smooth, glabrous, light greyish-green, inconspicuously dotted with darker green. Pedicel about 1½ inch long and 1½ line thick below, thickened above and gradually passing into the obconic ovary, and with light green. Calyx equally 5-lobed, glabrous; lobes revolute when the flower is expanded, 6-7 lines long, 2½-4 lines broad, ovate-lanceolate, obtuse or subacute without or with very narrow membranous edges. Corolla about 2 inches in diameter, commencing to open about 5 p.m., and fully open between 6 and 7 p.m., strongly scented (something like the odour of Coconut), closed during the day; petals in about 4 series, lax, the outer deflexed, the inner ascending-spreading, and the others in intermediate planes, 9-10 lines long, ½-line broad, acute, all incurved-hooked at the tips, bright yellow, changing to red when faded, shining. Stamens numerous, erect in a columnar mass, 5½ lines long, entirely yellow; filaments bearded at the base. Stigmas 5, filiform, twisted like a corkscrew and in that condition about 5 lines long, pubescent-stigmatose, yellow. Glands 5, large, in pockets at the base of the stamens. All the ovary conical, green. Fruit not seen.

Grigualand West: Near Campbell, Pole Evans, 6 891.

This is a very pretty, night-flowering species and is deliciously scented. The incurved tips of the lax and very numerous petals, and the corkscrew-like stigmas, are characters I have not noticed in any other plant of this group.

In general characters this accords with *P. Orpenii*, but the leaves are not velvety to the touch as in that species, and I have not seen fruit of either. I therefore refer it to this genus for the present.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 90: 13. 1931.
(Continued from page 389, Vol. LXXXIX.)

CONIGOSIA, N. E. Br.

17 Perennials or, in one or two species, of but two or three years' duration, either with fibrous roots and a single main stem terminating in a perennial dense tuft of leaves, with flowering branches produced from the basal part of the tuft, or with a long, fleshy or tuberous rootstock emitting from its top a central leaf-tuft and prostrate flowering-branches, or flowering branches only, with opposite or sometimes some alternate leaves scattered along them and a small tuft at the ends, deciduous after fruiting. Leaves in the large tufts crowded and appearing alternate, but in reality opposite in their origin, slightly stem-clasping at the base, erect or ascending except when old, long and narrow, either sharply 3-angled or subterete, and slightly channelled down the face, but in *C. fusiformis* described as terete, soft, without dots, pellucid or otherwise. Flowers large, solitary, on long pedicels. Calyx

13 subequally or unequally 5-lobed down to its union with the ovary; lobes with broad bases (the three inner with membranous margins) and subulate or terete tips. Petals very numerous, free, in several series, linear, often ciliate at the basal part. Staminodes numerous, filiform or hair-like, at first more or less incurved. Stamens numerous, at first incurved around or over the stigmas, afterwards spreading and exposing the latter; filaments bearded at the base. Stigmas 10-20, filiform; style none. Ovary inferior or partly superior, with a flattish top rising at the centre into a short cone, 10-20-celled; placentas on the outer wall of the cells; ovules several in each cell. Capsule dry, half superior, with the conical top separating into 10-20 narrow valves or segments, which stand more or less erect, not spreading when wetted and are without expanding-keels, but each valve bears a pair of thin, sub-membranous, wing-like cell-partitions on the inner face. Seeds rather large for this group, subglobose or somewhat lenticular, often slightly keeled at the margin, but not winged, smooth.-- N.E.Br., in The Gardeners' Chronicle, 1925, Vol. LXXVIII, p. 453, and in Phillips' Gen. S. Afr. Fl. Pl., p. 247.

Species 11, and doubtless several more, natives of South Africa, the type of the genus being *C. pugioniformis*, N. E. Br.

The name is derived from the Greek, konikos, conical, in allusion to the conical, top of the fruit.

Conicosia is easily distinguished from all its allies by its very flong and narrow, soft and dotless leaves, which Haworth likened to daggers, and by the peculiar capsule dividing into narrow, erect valves at the top when ripe, instead of remaining closed and expanding when wetted by means of expanding-keels, which are absent in this genus.

On account of the great resemblance most the the species bear to each other, their flowers especially, being all very much alike except in details, I am disposed to believe that several species yet remain to be discovered that have been mistaken for old species, and have not been collected. For a close study of the characters of the species that have hitherto been described and figured has revealed the fact that several wrong identifications have been made, causing much confusion of nomenclature. Haworth began the confusion by his misidentification of *C. pugioniformis*, and Salzm Dyck and others have followed. But it is quite impossible to understand how Klinsmann, in his *Flora Preyniana*, could have identified Breynia t. 80 (which is *C. pugioniformis*) as being *C. bicolorum*, Willd., a shrubby species, and Breynia t. 81 (which I believe to be *C. Muirii*) as being *M. molle*, Spreng. This confusion I have endeavored to disentangle, and have made explanations under the species.

Both Haworth and myself have supposed the leaves of this genus to be alternate, and when a large main tuft of leaves is examined it is difficult to form any other conclusion, but having now observed seedlings of four species develop, I find that the leaves are really opposite (see figure under *C. Reddiei*), but by a mode of displacement by succeeding leaves they become apparently alternate.

The fruit of this genus is very different in structure from that of any other. In the first place the cells or carpels of the ripe fruit are so lightly adherent to the calyx-tube that they can easily be separated from it. When quite ripe the valves slightly separate from each other, and the wing-like membranes (really cell partitions) attached to their inner face also become more or less detached from the central column. As the cells containing the seeds

13 alternate with the valves, each valve bears upon it (in the wing-like membranes on its inner face) the partitions belonging to the two adjacent cells. The cells themselves are very narrow, and each contains about one to four seeds.

All the species belonging to this genus are glabrous, except on the petals and stamens, and all grow i pure and or in sandy places. Therefore they should be cultivated in a light sandy soil, and the soil not allowed to get too dry at the lower part of the pt. They are best watered from below by standing the pot in a saucer of water. Their flowers are very showy. But I have seen one species growing and flowering most luxuriantly in ordinary garden soil in the open air in south Devonshire. And in climates not too cold for these plants to be cultivated in the open air, the species of this genus ought to find favour among cultivators.

The herbarium material that I have seen is very imperfect, the root, main stem and central tuft of leaves usually being quite absent, while the flowers are mostly badly pressed, and, ripe fruit definitely belonging to the same plant as the flowers is usually quite absent. So that dreid material is difficult to determine, and as the published figures of the species of thus genus have been indiscriminately named, much confusion of nomenclature have been made, as no heed has been paid to the few characters which the descriptions and figures portray. These characters I have made use of to indicate the various species in the key that follows. One of the best characters for distinguishing the species is that of the fruit, but this character I have not been able to made use of, as it is known to me only in a few cases, for the collection of the fruit in definite connection with flowering specimens appears to have been entirely neglected.

From the study I have made of this genus, I believe that it will ultimately be found to contain several other species as yet undescribed. I have fruits only of two others that are certainly distinct from any here described, and there are probably others, for in general appearance the species are so similar that their very real distinctions have not been noticed. For example, I find that plants with fibrous roots and a distinct stem under the central tuft of leaves, and others with a tuberous root-stock and a sessile central tuft of leaves have indiscriminately been named in South Africa as being "*M. pugioniforme* Linn.," which at the present day is unknown to botanists.

In the synonymy of the species, references are to previous monographs are sometimes omitted, because I find that as therd quoted ther is

14 sometimes a misture of species that makes the reference worthless and so it is not quoted.

Key to the Species.

1. Roots fibrous; plants developing a single and distinct stem 2-3 inches to 2 feet or more high under the central tuft of leaves, erect or bent down from the weight of the leaf-tuft and flowering branches; leaves sharply triangular in cross-section.

Rootstock tuberous, fleshy, long and cylindric or spindle shaped or irregularly ovoid, producing either a tuft of leaves without a stem under it, from among which the

flowering branches arise, or one or more prostrate stems bearing leaves and flowers at their ends and becoming deciduous.

2. Calyx-lobes shorter than or about equalling the petals, never exceeding them.

Calyx-lobes always or at first distinctly longer than the petals (sometimes on the third day the petals become about as long as the calyx-lobes), stem enduring for 2-3 years.

3. Stem up to 2 feet or more high, erect, enduring for 6-9 years; corolla 3-4 inches in diameter, with the outer petals an inch or more long and $\frac{1}{2}$ -1 line broad.

1, pugioniformis.

Stem under 6 inches high, erect; corolla $1\frac{1}{2}$ -2 inches in diameter, with the outer petals 3-10 lines long and $\frac{1}{2}$ -1 line broad.

2, brevicaulis.

4. Inner calyx-lobes with pallid, membranous margins; petals terete, smooth; corolla 11-12 inches in diameter, expanding in the afternoon.

3, communis.

Inner calyx-lobes with blackish or dark fuscous membranous margins.

5. Pedicels angular at the upper part and slightly roughish to the touch; corolla about 3 inches in diameter; leaves stated to be "nearly a foot" in length.

4, capensis.

Pedicels terete, smooth, not angular.

5, pulliloba.

6. Rootstock tuberous; leaves triangular in cross section, with flat or concave sides and sharp edges and keel; some of the calyx-lobes much longer than the petals.

Rootstock tuberous; leaves subterete or channelled down the face with rounded edges and rounded or obtusely-keeled on the back; membranous margins of the inner calyx-lobes blackish or dark fuscous.

7. Calyx without tubercles under the sinuses between the lobes and the membranes of the lobes whitish or pallid; capsule 13-18 lines in diameter with valves 6-7 lines long.

Bijlii.

Calyx with small tubercles under the sinuses between the lobes at the end of raised ribs radiating from the pedicel (sometimes absent), and the membranes of the lobes blackish; capsule about 12 lines in diameter with valves about 5 line long.

Muirii.

8. Calyx-lobes shorter than or about equalling the petals.

9

Calyx-lobes longer than the petals which are ciliate at the basal part with a few minute or short, straight hairs, often scarcely visible to the naked eye.

9. Petals ciliate at the basal part with long and conspicuous flexuose hairs; corolla 4-5 inches in diameter, expanding in the morning; tuber irregularly ovoid, "sometimes as large as the egg of a goose." *elongata*.

Petals ciliate at the basal part with short or minute straight hairs.

10. Rootstock a deformed or irregularly fusiform tuber 3-4 inches long; corolla about 3 inches in diameter and represented with lax petals. *affinis*.

Rootstock a cylindric or radish-like tuber 6-18 inches long; corolla $2\frac{1}{2}$ -4 inches in diameter; fruit very large, $1\frac{1}{2}$ -2 inches in diameter. *Roodiae*.

11. Leaves on the dried specimens 6-9 inches long and 3-3 $\frac{1}{2}$ lines thick, obtuse; corolla probably about 3 inches in diameter. *robusta*.

Leaves represented as being 3-5 inches long and about 2 $\frac{1}{2}$ lines thick, acute. *fusiformis*.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 90: 136. 1931.

(Continued from page 14.)

1. *Conicosia pugioniformis*, N.E.Br. in Phillips' Gen. of S. Afr. Fl. t. 247.-- No tuber, roots fibrous. Stem up to 2-3 feet high and up to an inch in thickness, erect, and enduring for 6-9 years. Leaves 6-9 inches long on the main stem, shorter on the flowering branches, triangular in cross-section, acute, with the upper or all three sides slightly concave and the angles all acute, of a somewhat glaucous-green, purplish at the base. Flowering branches a foot or more long, drooping, with upcurved tips. Pedicels smooth and rather terete than angular except at the apex. Calyx with the ovary-part somewhat campanulately obconic, and with five prominent ribs extending from the angles between the lobes down to the pedicel, on which they are represented as slightly decurrent; lobes shorter than the petals, the inner with pallid membranous margins. Corolla as represented membranous margin by Dillenius, up to 4 inches in diameter, opening about 8-9 a.m. and remaining open until 4-5 p.m. in sunshine; outer petals, as measured on the dried type specimen in the Dillenian Herbarium at Oxford, about an inch long and $\frac{1}{2}$ -1 line broad, but probably larger when alive, cuneately-linear, acutely acuminate, sparsely ciliate from the base to the middle pale yellow on the inner face, dull reddish on the back, all the inner ones entirely pale yellow, shining. Capsule 9-10 lines in diameter, dark brown, with 15-16 segments and cells. -- Gard. Chron., 1928, Vol. LXXXIV, 253.

Mesembryanthemum pugioniforme, Linn., Sp. Pl., ed. 1, 488, not of other authors, and founded upon *M. pugioniforme floreae* *mplo stramineo* of Dillenius, Hort. Elth., 280, t. 210, f. 269. *M. capitatum*, Lam., Misc. Bot., 41, 420 Syn. Fl. Gall., 18, excluding all synonymy, not *M. capitatum* of other authors (for which see *C. communis*).

South Africa: Locality and collector unknown; introduced into cultivation before 1732.

This species has been long lost to cultivation and so far as I have been able to ascertain is not known to South African botanists, who indiscriminately call several other species by this name. Haworth began the confusion of names by redescribing the Linnean *M. pugioniforme*, as a new species under the name of *M. capitatum*, for his description of and nearly all that he states about that species, nearly accords with *C. pugioniforme* as described and figured by Dillenius that I have no doubt whatever that the two names belong to one and the same plant. For according to Dillenius *M. pugioniforme* lives for six to seven years, and has a stout, erect stem; while Haworth states in a remark under *M. pugioniforme*, Lam. (not of Linn.), Synon. p. 229, that *M. capitatum* "is quite upright (when not overdrawn by a hothouse) and lives near eight or nine years in the greenhouse, and its flowers last rather longer on bloom than those of *M. pugioniforme*." In contradistinction to this he states that his *M. pugioniforme* (i.e., *C. capensis*, N.E.Br.) lives for only two or three years, and is little better than a biennial.

Other authors, without investigation of the description given by Dillenius, have confused other species with this, and have mostly accepted the plant figured by Salm Dyck, Mesemb. 16, f. 4., as being *M. pugioniforme*, but that which in my opinion does not differ from that which he figures (f.3) as *M. capitatum*, except in size, which I find in some of these plants varies in accordance with food supply, and both differ from the true *M. pugioniforme* in having much smaller flowers, with the calyx-lobes longer than the petals, as well as being of shorter duration.

The description above given is compiled from the description and type specimen of Dillenius, upon which the species was founded by Linne. Upon the sheet of the type specimen in the Dillenian Herbarium at Oxford is preserved the same mixture of fruit as is represented on the Dillenian plate above quoted, where four capsules are figured and numbered 1-4. Of these only Fig. 3 belongs to *M. pugioniforme*; the others belong to other genera. Concerning the fruit, Haworth's remark about it (under *M. capitatum*) is a little obscure, for he states: "I dare not cite this figure of Dill. Hort. Elth., t. 210, for this plant (although nearer to it than the next species), because the capsule there delineated is very much less depressed and not so broad as in this species, whose petals and leaves are shorter than those given on his plate." By "next species" Haworth refers to his *M. pugioniforme* which = *C. capensis*, N. E. Br. But from his statement that the fruit of his *M. capitatum* was broader and much more depressed was in some way mistaken, and from what I have observed in cultivated plants I suspect he had only an unfertilised and probably unripe fruit of *M. capitatum* before him, for all properly ripened and fully developed fruits of this genus have the top rising into a very distinct cone, while when they are unfertilised the cone is scarcely evident and does not develop, and the rim often remains broader than in the ripened fruit.

136 This is probably the correct explanation of Haworth's statement. The size of the flower as figured by Dillenius may be too large, but dried flowers that I have seen measure three inches in diameter; yet may have become shrunk in drying.

2. *C. brevicaulis*, N. E. Br. in Gard. Chron., 1928, Vol. LXXXIV, p. 255.-- Habit as in *C. capensis*. Stem 2-3 inches high, 3-4 lines thick, simple, erect. Leaves 2-6 inches long, and 2-2½ line broad, triquetrous, tapering to a very acute point, entirely green, not purplish at the base. Pedicels 2½-5 inches long. Calyx-lobes about equalling or a little shorter than the petals. Corolla 1½-2 inches in diameter; petals 9-10 lines long, 4-½ line broad, linear, very acute, but not hair-pointed, scarcely ciliate at the base, bright sulphur-yellow. Ovary flattish on the top, but with the centre slightly conical.

Mesembryanthemum brevicaulis, Haw., Suppl. Fl. Succ., p. 91 (1810), and Bot. p. 112; D. C. Prodr., t. 3, p. 409; Salm Dyck, Mesemb., § 16, f. 2; Sond. in Fl. Cap., v. 2, p. 409; Berger, Mesemb. p. 216; N. E. Br. in Journ. Linn. Soc. Bot., v. 45, p. 126.

South Africa: Locality unknown; seeds were collected by Burchell between the Vaal River and Graaff Reinet during a journey from Griquatown, in 1812, from which plants were raised in England and described by Haworth.

No dried specimen of this plant is known to

137 exist, but there is a drawing of the type plant preserved in the Kew Herbarium, and Salm Dyck's figure correctly represents this species.

3. *C. communis*, N. E. Br.-- No tuber, roots fibrous. Stem 4-12 inches long, erect or bending down and of about 2-3 years duration, producing at the base of the central tuft of leaves flowering branches which become deciduous. Leaves of the central tuft 4-6 inches or those 3-4 lines broad and about as thick, those on the flowering branches smaller, linear-trigonous, acute, with slightly concave faces and acute angles, smooth, glabrous, green purplish at the base, more or less glaucous. Pedicels 2-5 inches long, 1½ line thick, smooth, glabrous., green. Calyx-lobes longer than the petals, subequal or somewhat unequal, 10-15 lines long, terete, acute, abruptly dilated into an orbiclar ovate base, glabrous, green, three of them with pallid membranous margins. Corolla 1.-2½ inches in diameter, opening between 3 and 4 p.m., and closing about 7 p.m.; petals in about 6 series, 7-10 lines long, ½ line broad, linear, acute, not hair-pointed, ciliate at the basal part with short, straight hairs, bright, clear yellow, the outer tinted with red at the tips and bronzy-yellow on the back, shining. Between the petals and the stamens are 3-4 lax series of filiform, yellow staminodes more or less incurved, a few of them bearing anthers. Stamens very numerous at first inflexed closely around the stigmas, but after the third day becoming lax and standing away from the; filaments pale lemon-yellow, with a dense ring of white hairs around their base; anthers of a darker yellow. Stigmas 12-15, at first erect in a bunch with their tips protuding shortly and in this condition appearing filiform, finally becoming revolute from the base and are then flat, linear and nearly or quite ½-line broad, pale lemon-yellow. Top of the ovary broadly and shortly conical, green.

Mesembryanthemum capitatum, Edwards in Bot. Reg., t. 494, as to figure only (not as to description which is copied from that of the true *M. capitatum*, Haw., Misc. Nat., p. 41); Salm Dyck, Mesemb.,

137 16, f. 3; Sonder, in Fl. Cap. II, 409; and Berger, Mesemb., 217, f. 44, not of Haworth. *M. pugioniforme*, Salm Dyck, Mesemb., 16, f. 4, excluding references to Dillenius, Hort. Elth., not of Linne, and possibly the unknown *M. pugioniforme* var. *biennae*, Haw., Rev. Pl. Succ., 112, may belong here.

Cape Division: Camp ground, Wolley Dod 2374. Chapmans Bay, Wolley Dod, 1754 near Vyge Kraal, MacGowan, Herb. Austr. Afr., 1749. Diepriver Station, Kuntze.

N.B.-- I have fruits of two species that grow in Cape Division. One has the back of the valves flat, the other has them grooved, but as neither of them are connected with flowering specimens and are without notes, I do not know which of them belongs to this species, therefore do not quote them.

This plant (together with other) has been confused by authors with *C. pugioniformis*, and in South Africa I believe passes under that name, but is smaller flowers, with the calyx-lobes longer than the petals, narrower petals, and shorter duration, clearly distinguish it from that species.

Salm Dyck's figures of *M. capitatum* and *M. pugioniforme* above quoted appear to me to represent only one species, one figure being that of a larger and more vigorous plant than the other, as there appears to be no difference other than size in the figures or descriptions; and neither figure represents *M. capitatum*, Haw., nor *M. pugioniforme*, Linn.

The result of all this previous confusion is that the present plant has remained without a name of its own until the present time.

It is not improbable that the plant figured in Zanoni's *Istoria Botanica*, p. 35, f. 13 (1675), under the name "*Astero aizoides del Capo di Buona Speranza*," may be this species. The figure represents a young plant without flowers, with the root and leaves like those of *C. communis*.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 90: 335. 1931.

(Continued from page 137.)

CONICOSIA.

335 4. *C. canensis*, N.E.Br., in Gard. Chron., 1928, LXXXIV, 253.-- No tuber, roots fibrous. Stem six inches or more high and enduring for only about two or three years, or according to Haworth (Synop. 229) "little better than a biennial, and incapable of sustaining itself erect,". Leaves of the central tuft very long, often nearly a foot in length, compressed-tricostate, somewhat channelled and angular flowering branches shorter, glaucous. Pedicels 5-6 inches long, angular and rough. Calyx-lobes longer than the petals, three of them with scorched (erectus) membranous margins, probably causing that they are of a blackish-or dark fuscous colour. Corolla about three inches in diameter; petals shorter than the calyx-lobes, straw-yellow, very shining. Stamens with straw-yellow filaments and darker yellow anthers. Stigmas 15, finally spreading and linear-lanceolate, with the sides somewhat papillose, straw-yellow.

Mesembryanthemum pugioniforme, Haw., Misc. Nat., 42, Syn. Pl. Succ., 228, and Rev., 112, excluding all synonymy and vars. b. and g., which do not belong to this genus; and var. d., if it was really distinct from var. a., I suspect was intended to represent the plant

335 here named *C. communis*. Not *M. pugioniforme*, Linn.

South Africa: Locality and collector not stated, but see note below.

The above description is translated from Haworth's account of of the plant he described as *M. pugioniforme*, but which on account of its shorter duration, angular and rough pedicels, calyx-lobes longer than the petals and with fuscous membranes, cannot be the same as *M. pugioniforme*, Linn.

Haworth states that this species is nearly twice as large as and more glaucous than his *M. capitatum* (which = *C. pugioniformis*), and that its flowers open earlier in the morning but do not last so long.

Apparently no type or figure of the original plant has been preserved, and as the locality from which it came is unknown, this species cannot be identified with absolute certainty. But I have a branch of a plant that was sent to me by Dr. Vaughan Brown from the region of Saldanha Bay, which in habit its angulate and slightly rough pedicels and fuscous membrane of its calyx-lobes corresponds with Haworth's description of *M. pugioniforme*, and as the region is one from which plants were introduced at the end of the eighteenth century, it is not impossible that Haworth's plant may have come from that area. Therefore, in the absence of any evidence to the contrary, I propose that this Saldanha Bay plant be considered as being the type of *C. capensis*, until proved not to be so, and give the following account of the dried fruiting material I have:--
Flowering branches apparently much like those of *C. communis* and more or less angular. Leaves very shrivelled, but one or two appear to have been acutely trigonous. Flowers 5 or 6 at the end of the branch. Pedicels 3-5 inches long, distinctly angular at the upper part, and slightly rough to the touch. Capsule (Fig. 138) from edge to edge of rim 1-1½ inch in diameter, shallowly hemispherical beneath, with ridges radiating from the pedicel, where they are almost wing-like, to the sinuses between the calyx-lobes, and on the top with about 15 valves raised into a cone 7-8 lines high and 3-4 lines in diameter at its base. Seeds 2/3-line long, ellipsoid and distinctly much longer than thick, smooth, brown, spotted with darker brown.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III..91: 104. 1932.
(Continued from page 335, Vol. XC.)

CONIOSIA.

104 5. *C. pulliloba*, N.E.Br.-- (Fig. 42). Plant apparently like *C. communis* in habit, size and general appearance, with decumbent flowering branches up to a foot long, terete, smooth. Pedicels 3-5 inches long, terete, smooth, not angular. Flowers apparently very similar to those of *C. communis* in size and colour, but with the membranous margins of the calyx-lobes dark fuscous, not pallid. Petals shorter than the calyx-lobes. Stigmas about 15. Capsule from edge to edge of the rim an inch or rather more in diameter, and the cone of carpels about six line in height, with the valves grooved on the back.

Cape Division: Near Malmesbury Road through Riet Vley, Wolley

104 Dod, 3478, and a cultivated plant.

Dried specimens of this plant are so like those of *C. communis* that until I noticed the dark fuscous membranes of the calyx-lobes I had considered it to be that species, but these indicate a difference that would probably be more apparent if living plants of them two species were compared side by side in flower and fruit. In its fuscous calyx-membranes it agrees with *C. capensis*, but differs from that species in its smooth and terete, not rough and angular pedicels. Mr. T. W. Leslie sent me a photograph of a flowering branch, produced at Fig. 42, together with seeds of this species, from which I raised a plant that dies after flowering. Its origin was unknown to Mr. Leslie.

11. *C. Muirii*, N. E. Br., in Gard. Chron., 1928, LXXXIV, 287 (Fig. 43).-- Rootstock a fleshy cylindrical or radish-like tuber, 8-17 inches long and $\frac{1}{2}$ -1 inch thick, deeply descending and emitting from the top a sessile tuft of leaves and 5-17 radiating, prostrate or decumbent flowering branches 2-15 inches long and 1 line thick; the whole plant (except petals and stamens) glabrous. Leaves of the central tuft 4-7 inches long, 2-3 lines broad and $1\frac{1}{2}$ -2 lines thick, those on the branches smaller, somewhat sharply triangular in section, with slightly concave faces, acute, entirely green or with the basal part dark purple passing into light violaceous, glabrous. Flowers three to several to a branch. Pedicels 2-3 inches long, 1 line thick, terete, tapering upward, smooth, green. Calyx with the ovary-part shallowly hemispherical, 5 lines broad and 2 lines deep, with 5 slight ribs, each ending between the bases of the lobes in a small, blunt tooth; lobes $2-1\frac{1}{2}$ inch long, much longer than the petals, linear-trigonus from a broad, ovate base, the inner with broad fuscous, or flackish membranous margins. Corolla $1\frac{1}{2}$ -2 inches in diameter, opening in double; petals in 5-6 series, spreading in different planes, the outer 6-9 lines long, $\frac{1}{3}$ - $\frac{2}{3}$ line broad, linear, very acute or acuminate, ciliate at the base, with short, fine hairs; the inner gradually smaller with hair-like, curly points; all bright lemon-yellow, the outer dull red or purplish-red on the back. Staminodes filiform, bearded at the base, with tortuous hair-like tips intermingling in a web-like manner, lemon-yellow. Stamens about $2\frac{1}{2}$ -3 lines long, erect, with recurved tips, filiform, pale yellow. Ovary flattish at the top with the centre slightly raised, light green. Capsule 11-14 lines in diameter, with the cone on the top about 5 lines high and with 10-20 valves and cells, the rim around the base of the cone about $1-1\frac{1}{2}$ line broad. Seeds rather more than $\frac{1}{2}$ -line in diameter, compressed-globose, smooth, mottled with light and dark brown, not shining.

Riversdale Division: In sandy places to 100-300 feet altitude. Muir 999 and 4128. Flowering from August to December.

To this species I feel almost certain the plant figured as *Chrysanthemum aizoides africanum triangulari folio*, Breyne, Exot. Fl., p. 163, t. 181 (1678), should be referred, as it has the same kind of foliage and flowers, and the root is stated to be like that of *C. fusiformis* but larger. As it was in cultivation in 1668, this plant is one of the oldest known members of the Mesembryanthemum group, and the second species of Conicosia brought into cultivation. Breyne's figure is copied in Morison's Plant. Hist., III 12, 507, t. 6, c. 11 (1679), and has also been wrongly identified as being *M. molle*, Spreng. (= *M. molle*, Lit.) by Klinsmann.

Dr. Muir informs me that the Dutch name for this plant is

104 "Eendjies" or "ducklings," owing to the yellow colour and soft appearance of the flowers. Mrs. van der Bijl described the flowers as 'like a powder-puff.' But as the flowers
105 of all the species of this genus are very much alike, it is probable that several species are called by the above name, just as this and other species have all been names, "E. rugioniforme" by expert South African botanists.

According to Dr. Muir, the root, when transplanted, is apt to rot and not to grow. This has been my own experience with roots of C. Roodiae that have been sent to me. Dr. Muir also informs me that this plant can be grown from cuttings, but they are difficult to set to root.

I have been a specimen collected by Dr. Phillips of a plant that seems to be similar to C. Muirii, but yet may be a distinct species, since it has longer calyx-lobes and their membranous margins are pallid. It is stated to be "a succulent herb with yellow flowers, common" at Slang River," and that its common name is "Slang Gaukum."

W. E. Brown

(To be continued.)

MESEMBRYANTHEACEAE.

Chron. III. 91: 121. 1932.

(Continued from page 105.)

CONFICOSIA.

121 7. * C. Bijlil, N. E. Br.-- (Figs. 47 and 48).-- Rootstock

* 11. C. Muirii, N. E. Br., on p. 104, should read 6. C. Muirii, N. E. Br. W. E. Brown

fleshy, Radish-shaped or perhaps cylindric (not properly examined). Habit like that of C. Muirii, with a central tuft of leaves 5-7 inches long, $2\frac{1}{2}$ -3 lines broad and $1\frac{1}{2}$ -2 $\frac{1}{2}$ lines thick, tapering from base to apex, acute, and usually triangular in cross-section, glabrous green. From the base of the central tuft grow several decumbent flowering branches 4-6 inches long, bearing several pairs of opposite leaves smaller than those of the central tuft and 1-3 flowers. Pedicels 2-3 $\frac{1}{2}$ inches long, 1 line thick, terete, slightly tapering upwards, smooth, glabrous, green. Calyx-lobes 4 or 5-part shallow, hemispherical, 5-6 lines broad and 2- $\frac{1}{2}$ lines deep; lobes 2-1 $\frac{1}{2}$ lines long and much longer than the petals, the inner with whitish membranous margins. Corolla $1\frac{1}{2}$ -2 inches in diameter expanding in the morning in sunshine or dull weather, closing at night; petals very numerous in about 5-6 series and much shorter than the calyx-lobes, 5-9 lines long, $1\frac{1}{3}$ - $2\frac{1}{3}$ lines broad, narrowly linear, very acute, the inner passing into stamens, bright lemon-yellow, the outer dull red on the back, shining, and glabrous with short hairs for $1\frac{1}{2}$ - $\frac{1}{3}$ of their length. Stamens very, but not so numerous as in C. Muirii in the living flowers seen, hair-like, contorted, lemon-yellow. Anthers about 2 lines long, with yellow filaments not heard of at the base, and light orange latheae. Stigmas 16-20, about 2 lines long, filiform, light yellow, at first

121 erect with spreading tips and the anthers pressed closely against their basal part; ovary nearly flat on the top; capsule 11-14 lines in diameter, with the cone about 5 lines high and composed of 16-20 valves, grooved on the back. Seeds rather more than $\frac{1}{2}$ -lines in diameter, compressed-globose, smooth, mottled with dull light and dark brown, not shining.

George Division: The Wilderness, Mrs. D. van der Bijl, 12. Mrs. van der Bijl, when sending this, expressed the opinion that it was an annual, but I think it must be a perennial with a fleshy rootstock and perhaps deciduous leaves and branches. I only succeeded in raising one plant of it which I failed to keep alive through the winter. Fig. 48 represents this plant just coming into flower, with two buds upon it, but I was unable to obtain a photograph of it when in flower. Fig. 47 represents a diagrammatic section through one of its flowers. It is very like *C. Muirii*, but differs by the membranes of the calyx-lobes being whitish and by the absence of a small tubercle under the sinues of the calyx-lobes, and the flatter ovary.

8. *C. elongata*, N. E. Br., in Gard. Chron., 1928, LXXXIV, p. 253 -- Rootstock nearly as large as the egg of a goose, thick and irregular in shape according to the figure. Stems few, prostrate. Leaves 8-9 inches long, obsoletely trigonous or rarely somewhat terete, channelled above at the basal half, obtuse, laxly crowded into a head, very glaucous, withering and deciduous. Flowers 1-3, terminal on the branches, when 3 the central pedicel is nearly as long as the leaves and the lateral ones much shorter. Calyx very large, subcampanulate; lobes unequal, shorter than the petals, two much larger than the rest, flat and ovate at the base, with elongated filiform tips, and three with pallid membranous margins veined with fuscous. Corolla 5 inches or more in diameter, expanding in the morning, showy, with an odour like that of a goat. Petals in many series, very narrow, very acute and almost hair-like, of a brilliant sulphur-yellow, ciliate from the base to the middle with long and conspicuous flexuose hairs. Stamens very numerous, short, the outer erect, the inner convergent, sulphur-yellow. Stigmas 10-19, as long as the stamens, with recurved tips.

Mesembryanthemum elongatum, Haw., Obs., 236, Misc. Nat., 40, Synop., 228, and Rev., 113, and also in Bot. Reg., t. 493, as to root only and Latin description of var. a.; Sonder in Fl. Cap., II, 409, excluding syn. *M. pugioniforme*; not of other authors. *M. elongatum* var. *minus*, Haw., Rev. Fl. Succ., 114. *M. elongatum* var. *b.*, Haw. in Bot. Reg., t. 493, as to the flowering branch only, may be a different species.

South Africa: Locality and collector unknown. Haworth gives the locality as "Australia," but that is obviously an error.

This plant is only known from Haworth's description, of which the above is a translation. The large size of the flowers and long, tortuous cilia on the petals would seem to be very striking characters.

9. *C. affinis*, N.E.B., in Gard. Chron., 1928, LXXXIV, 253. -- Rootstock in a deformed or irregularly fusiform or ovoid tuber 3-4 inches long, producing one or a few leafy annual branches at its apex. Leaves lax, 4-6 inches long and $1\frac{1}{2}$ line broad, linear-subulate, concave-channelled above at the basal part, terete at the apical part, rounded on the back, slightly glaucous green. Pedic-

121 cels 5-6 inches long, terete. Calyx subequally 5-lobed; lobes much shorter than the petals, subulate from a broad base, with fuscous membranous margins to three of them. Corolla about 3 inches in diameter. Petals numerous (about 90 and somewhat lax, as figured), in about 3 series, about 15 lines long and 1/3-line broad at the base, tapering to hair-like points, ciliate at the base with minute, straight hairs. Stamens and staminodes very numerous, incurved-connivent as in other species. Stigmas 14, filiform, recurving.

Mesembryanthemum elongatum, Salm Dyck, *Mesemb.*, 316, Fig. 1, and Berger, *Mesemb.*, p. 216, not of Haworth.

South Africa: Locality and collector unknown. As Salm Dyck's work commenced publication 1836 and the plate representing this plant was issued in the second fascicle, it was probably introduced before 1836.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 91: 144. 1932..

(Continued from page 121.)

CONIOSIA.

144 10. *C. Roodiae*, N. E. Br., in Gard. Chron., 1928, LXXXIV, 253.-- Seed Fig. 59.-- Rootstock a long, deeply descending white, fleshy tuber. 6-18 inches long and about half-an-inch thick, producing one to several leafy stems from its top. Leaves of the central tuft (in the plant seen) about 6-8, erect or ascending, 2-5 inches long, 2-2½ lines broad and the same in thickness, gradually tapering from above the middle to an acute point, flattish or slightly channelled on the upper side nearly to the apex, obtusely glabrous, keeled on the back, the sides convex, smooth, glabrous, glaucous-green, without dots. Flowering branches 2-13 inches long, and 2 lines thick, arising from the top of the tuber at the base of the central tuft of leaves, glabrous, pale green. Flowers solitary. Pedicels 3½-4 inches long, 1½ line thick, smooth, glabrous, pale green. Flowers solitary. Calyx 5-lobed; ovary-part hemispherical, 6 lines in diameter; lobes 5-16 lines long, shorter than or about equalling the petals, the outer subulate from a broad base, the inner broadly ovate or elliptic or transversely elliptic-oblong, green at the central part, with very broad membranous, fuscous margins, marked with darker transverse veins. Corolla of the cultivated plant, and of a dried native flower seen, 2½ inches in diameter, but stated to be "fully 3½-4 inches in diameter," expanding in the afternoon and closing at night, lasting 7-8 days, with a slight and peculiar odour; petals very numerous, in 3-4 series, lax, recurved, spreading in different planes, free, 14-15 lines long, ½ line or less broad, linear, very acute, sparingly ciliate at the base, with minute, straight hairs, scarcely perceptible without a lens, sulphur-white in the cultivated plant, but stated to be "of a beautiful rich yellow colour" on the wild plant, as indeed it appears to be in a dried flower of the wild plant. Stamens very numerous, loose, 3 lines long, at first incurved over and concealing the stigmas, finally spreading and forming a ring around and exposing the top of the ovary and stigmas; filaments very slender, bearded at the base, whitish; anthers yellow. Stigmas 16-18, nearly 2 lines

144 long, filiform, pale yellowish, ascending-spreading, with recurved tips. Ovary inferior, the top at the centre rising into a cone, with the part around its base concave, light green. Capsule very large, 11-2 inches in diameter, the rim about 1-2 inches shaped, with the 16-18 valves, grooved on the back, rising in a cone at about 3 lines within the margin, glabrous, pale brown; each valve bearing in its lower part two large, wing-like, triangular pallid membranes (cell-partitions) closed together, 9-10 lines long, 2 lines broad at the base, growing upward to an acute point. Seeds few in each cell, nearly 1 line in diameter, slightly compressed-oblong and slightly keeled all round, smooth, pale brown.

Van Rhynsdorn Div.: near Van Rhynsdorn, Mrs. E. Rood.

This species differs from *C. elongata*, N.E.Br., by the tuber being very long and slender, not swelling out into an irregularly ovoid mass, by its leaves being concave above nearly to their tips, by its smaller flowers, and by the petals (which appear to be long hair-like) being very inconspicuously ciliate, with minute straight (not long and flexuose) hairs.

Possibly the plant figured in the Botanical Register, t. 493, as *C. elongata* var. *minus*, Torr., as to the flowering branch only (not the root) may belong here. It is not typical *C. elongata*, and no description is given of its rootstock, the figure of the tuber on that plate being made from typical *C. elongata*. The figure is made from a plant raised at Leiden from seed in 1812, and was published on November 1, 1820, so could have been only one year old. It agrees with *C. Roodiae* in its characters, except that the stigmas are described as being deep yellow. It differs from *C. elongata*, petals being straight and minute so as to be scarcely visible to the naked eye.

In the Coperberg Mountains, Little Namaqualand, there is a species with a tuberous rootstock stated to be 12 inches long, that has a large fruit very similar to that of *C. Roodiae* in size, but the cone of valves is shorter, the valves differently curved and the wing-like partitions adherent to the valves much shorter, so that is probably a different species.

Since the above was in type, I have received from Professor G.C. Nel a living specimen of the plant upon which the genus *Herrea* was founded by Schimper in *Göttinger Botanical Zeitung*, 1887, p. 436, upon imperfect material and without giving it a specific name. This plant proves to be merely a species of *Conicosia* and in all appearance is identical with *C. Roodiae*, under which I place it as a synonym. Its flower has been described by Mrs. Bolus (*Notes on Mesemb.* II, 233) without having identified it as being a *Conicosia* and without a specific name.

11. *C. robusta*, N.E.Br., in *Gard. Chron.*, 1928, LXXXIV, 253.-- Rootstock not seen nor mentioned on the label but judging from the specimens seen) doubtless tuberous. Dried flowering branches only seen. $3\frac{1}{2}$ lines thick. Leaves opposite, 6-9 inches long, 3-3 $\frac{1}{2}$ lines thick, the ultimate or so-called bracts 4-4 $\frac{1}{2}$ inches long, their sectional form indeterminate, but apparently not acutely auricular, obtuse at the apex. Each branch seen has three flowers, the central one with a pedicel $\frac{1}{2}$ inches long, 1-1 $\frac{1}{2}$ line thick; lateral flowers in bud only. Calyx with the longer lobes exceeding the petals and 1-1 $\frac{1}{2}$ inch long, the 3 inner with broad, blackish, membranous margins. Corolla probably about 3 inches in diameter; petals very numerous,

144 the outer apparently 12-15 lines long and $\frac{1}{2}$ line broad, linear, tapering to a very fine point, apparently not ciliate at the base; the inner gradually shorter and narrower, pale yellow. Staminodes hair-like. Stigmas not seen.

M. pugioniforme, L. Bol. in Ann. S. Afr. Mus., IX, 144, not of Linnaeus or other authors.

Little Namaqualand: At Twee River, common in sandy ground from Stinkfontein to Lilliefontein, Pearson 6438.

Described from dried specimens, but from its very long and very stout obtuse leaves, it is evidently very distinct from all the others here described. It appears to be near *C. elongatum*, but has much smaller flowers and the petals are not ciliate with long flexuose hairs. The leaves may have been subterete.

12. *C. fusiformis*, H.E.Br., in Gard. Chron., 1928, LXXXIV, 25-3.-- Rootstock a fleshy, white, fusiform or Radish-like tuber about 9 inches long and as thick as the finger. Leaves tufted, 3-5 inches long, $2\frac{1}{2}$ lines thick, terete, acute, yellowish-green, slightly shining. Pedicels about 4 inches long. Calyx-lobes longer than the petals, with leaf-like tips. Corolla about $2\frac{1}{2}$ inches in diameter. Petals numerous, in 3 or 4 series, about an inch long, linear, acute, not tapering to hair-like points, sulphur-yellow, with the basal part yellow. Stamens golden-yellow.

Mesembryanthemum fusiformis, Haw., Misc. Bot., p. 41, founded upon *Chrysanthemum aizoides africanum teretifolium*, Breyne, Exot. Plant., p. 161, t. 20. *M. bicolorum*, Klinsmann (clavis, Breyne).

Robben Island. Introduced into Dutch gardens about 1667.

This is the first species of this genus to have been introduced into cultivation, and during the 252 years that have elapsed since the publication 1678 of Breyne's account of it (from which the above description has been made), nothing more appears to have been known of it. For it soon died out of cultivation and no modern collector has rediscovered the plant, which is stated to have been found on Robben Island. In its terete leaves it differs from all others except *C. elongatum*.

The plant wrongly figured as being *M. pugioniforme* in DC. Fl. Grass, t. 72, may possibly belong here, but its leaves are represented as channelled down then upper side, otherwise the characters seem to agree with those of *C. fusiformis*.

Excluded Species.

M. coruscans, Haw., Suppl. pl. Succ., p. 90.-- Haworth's account of this is as follows:--

"Leaves of the head or tuft very long, dagger-shaped, glittering; stem perennial.

"I have not seen this alive, but my most excellent discriminating friend Mr. John Howard, now of Elstead, in Surrey, in 1813 communicated to me a dead branch, eight inches long, with a ripe capsule and three bracteal leaves several inches beneath the calyx, and each two or three inches long. His letter which accompanied it, said it was a new species allied to *M. spectabile*, but glittered like *M. micans*. To me it appeared so closely like *M. pugioniforme* in every respect, in its dry state, that but for his letter I should have thought it the same. It lives and flowers several years and is yet living. 'Its flower exactly resembled that of *M. pomeridianum* of Pot. Mez., with the rounded calycinal leaves, and shining like that plant.' Mr. Howard's letter."

From this account I feel sure some mistake was made, and that in reality a dried flowering branch of *C. pugioniformis* was sent to Haworth, but in the mind of Mr. Howard was either confused with another plant that had glittering leaves, or else that he merely meant that the plants of the flower were shining, and the leaves are. The above is too confused an account to permit of the retention of the specific name.

M. pugioniforme var. *purpureum*.-- Flowers purple. and *M. pugioniforme* var. *carneum*.-- Flowers pink. Haworth, Rev. Fl. Succ., p. 118. These names were originally based upon *C. africanum triangulari folio flore purpureo*, and *C. aizoides africanum triangulari folio flore carneo*, Pringle, Bot. Fl. L., p. 184 (1878).

South Africa: Locality unknown.

Nothing whatever is known of these plants. They evidently do not belong to this genus. I suspect that they are *C. africanum triangulari* or *C. aizoides africanum triangulari*. From the descriptions it is utterly impossible to form a correct opinion of them. They were two plants cultivated in Holland before 1678, of which Haworth had no knowledge.

N. E. Brown

(To be continued.)

MESEBRYANTHEMUM.

Gard. Chron. III. 91: 205. 1972.

(Continued from page 144.)

SAPHESIA, N. E. Br.

Perennial (or biennial?), herbaceous, succulent. Leaves opposite, not united at the base, flat, entire. Stem branching, with distinct internodes, not woody. Flowers solitary, terminal, on long pedicels. Calyx unusually 5-lobed. Petals numerous, free, shorter than the calyx, surrounded by numerous stamens. Stigma 1, erect, filiform. Ovary inferior, 3-celled, with the placentae on the floor of the very shallow cells. Fruit unknown.

A monotypic genus, native of South Africa.

The name is derived from the Greek, *saphes*, distinct, because the plant is quite distinct from every other known member of the family.

Although only known from Jacquin's excellent figure and a single specimens in Kew Herbarium, without fruit, this plant is so unlike any of its allies that it cannot be placed in any genus known to me. I therefore make a fresh one for its reception. Its leaves remind one of those of those *Prenia*, while its long-stalked flowers recall those of *Carpenthea*, but are totally different in structure.

1.-- *S. flaccida*, N.E.Br.-- Plant herbaceous, glabrous, 3-6 inches high. Rootstock apparently perennial, but may perhaps die after flowering, stated to produce during the first two or three years only a rosette of leaves, which fall away when the plant produces flowers. Flowering stems simple or branched, terete, 1-5 lines thick, with internodes 1-1½ inch long, and stated to be weak and flaccid, bearing 2-3 pairs of leaves, light green. Leaves opposite or sub-opposite, sessile, not united at the base, spreading and slightly recurved, 1½-2 inches long, ¾-1 line broad, linear-lanceo-

205 late, acute, entire, flat above but becoming concave at the base, obtusely keeled on the back, green. Pedicels $1\frac{1}{2}$ -7 inches long, 1-2 lines thick, terete. Calyx unequally 5-lobed; ovary-part somewhat hemispheric, rather shallow; lobes 1-1 $\frac{1}{2}$ lines long, 1-4 lines broad, varying from ovate-lanceolate to somewhat spatulate, acute. Corolla 11-11 $\frac{1}{2}$ inch. in diameter; petals numerous, in 2-4 series, much shorter than the calyx-lobes and 1-2 lines long, less than 1 line broad, linear, very acute, yellow. Stamens about 2 lines long, apparently surrounded by staminodes; anthers yellow. Stigmas 5, erect, 2 lines long, filiform. Fruit unknown.

Mesembryanthemum flaccidum, Jacq., Hort. Schoenbr. IV, 38, t. 475. Haw., Rev. Pl. Succ., 158.

South Africa: Locality unknown, cultivated by Jacquin before 1804; also a specimen at Kew collected by Thom.

N. E. Brown
(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 91: 262. 1932.

(Continued from page 205.)

APATESIA, N. E. Br.

262 Dwarf annual, branching at the base, and the branches decumbent. Leaves opposite, petiolate, flat or concave like a spoon, with the petiole dilated below into an open sheath, not united in pairs at the base, and not dotted. Flowers solitary, terminal, on long pedicels. Calyx produced a little beyond its union with the ovary into a saucer-shaped limb, unequally 5-lobed above; ovary-part shallowly hemispherical; lobes narrowly spatulate from a broad base, the inner with broad membranous margins. Corolla, staminodes and stamens arising from the saucer-shaped limb of the calyx; petals numerous in 4-5 series, free, widely spreading. Staminodes numerous, hair-like or petal-like at the base and hair-like above, contorted, at first more or less bent over the stamens, afterwards becoming more erect. Stamens numerous, all inflexed, bent down upon the top of the ovary and then uncurved around the style and stigma; inner filaments bearded at the base. Style stout, with 10-12 short, filiform stamens radiating from its apex at about the level of the anthers. Ovary entirely inferior, shallow, flat on the top and sunk below the rim of the calyx, with 10-12 cells; placentas on the outer wall of the cells; ovules many in each cell. Capsule shallow, slightly convex beneath, circular in outline, with 10-12 valves and cells; valves horizontally spreading when expanded, narrowly deltoid; expanding-keels about half as long as the valve, and subcontiguous into a central keel, adnate to the valve throughout their length, without free tips or wings; cells open, without a trace of cell-wings, and no tubercle. Seeds, in the only capsule seen, only one in each cell, obovate, without a nape, smooth, glabrous.--N. E. Br., in Gard. Chron., 1932, Vol. LXXXI, 17, and Journ. Bot., 1928, 80.

Species 3, natives of South Africa. The type is *A. Killansii*, N. E. Br.

The name is derived from the Greek, apatesis, deception, because of the resemblance of the plant to the genus *Euphorbia*.

Key to the Species.

1. Ovary perfectly flat and 5-angled beneath; pedicels 6-7 inches long; stigmas long, united below.

2. *helianthoides*.

Ovary slightly convex beneath and sometimes angular.

2

2. Pedicels 2-4 inches long; stigmas $\frac{1}{4}$ line long, radiating from the top of a stout style; ovary flat on the top.

1. *Pillansii*

Pedicels $1\frac{1}{4}$ -5 inches long; style none; stigmas $1\frac{1}{2}$ -2 $\frac{1}{2}$ lines long, filiform; ovary conical at the top.

3. *Maughani*.

1.-- A. *Pillansii*, N. E. Br. in Gard. Chron., 1927, Vol. LXXXI, 12 and Journ. Bot. 1928, 138. (See Figs. 110 and 111 and 112).-- Annual, 4-5 inches high, glabrous on all parts except the filaments of the stamens, central stem short, with 8-10 pairs of leaves, internodes very short at the base and $\frac{1}{2}$ -1 inch long at the upper part, most or all of the leaves producing procumbent or ascending axillary branches up to 6 or 8 inches long, with internodes up to $1\frac{1}{2}$ inch long. Leaves opposite, petiolate, spatulate, on young plants arranged in 4 vertical ranks on the central stem, withering and disappearing as the plant ages, at first erect and with a tendency to turn themselves edgewise to the sky, becoming more or less spreading; petiole $\frac{1}{2}$ - $1\frac{1}{2}$ inch long, channelled at the upper part, sheathing but not united at the base; blade 1-2 inches long, 5-13 lines broad, elliptic to lanceolate, acute or subacute, tapering into the petiole, entire, flat or more or less concave and on young plants often with the upper part more or less incurved and so resembling shallow spoons, becoming flat on flowering plants, thinly fleshy in substance, flowering plants smooth and cool to the touch, uniformly green, not glaucous, without dots, glabrous.

Flowers terminal, often 3 on each lateral branch, developing successively. Pedicels 2-4 inches long, about 1 line thick at the base, slightly tapering upwards, without bracts, smooth. Calyx unequally 5-lobes, with the united part shortly produced in a flattened (not cup-like* manner beyond its union with the ovary, where it is shallowly hemispherical and about $1\frac{1}{2}$ line deep, and has 5 small and rather indistinct angles alternating with the lobes at their base, smooth, green; lobes narrowly spatulate from a broad, ovate base, two of the lobes 6-7 lines long, the others shorter, the 3 inner with broad membranous, fuscous margins. Corolla 16-22 lines in diameter, expanding between 1 and 3 p.m., and closing between 5 and 6 p.m., in dull or sunny weather, slightly scented; petals very numerous in about 5 series, the outermost recurved, the others widely spreading, rather loose and not closely overlapping one another when fully expanded in bright sunshine, the outer 8-9 lines long and the inner 5-6 lines long, $\frac{1}{2}$ - $\frac{3}{4}$ line broad, linear, very acute, bright lemon-yellow shading into white at the base. Staminodes numerous, the outer narrowly petaloid at the basal part gradually passing into petals; the inner hair-like, curly, whitish, and at first connivent over the stamens. Style nearly 1 line long, stout. Stigmas 10-12, about $\frac{1}{2}$ line long, filiform (not plumose), radiating, creamy white. Ovary flat on the top, 10-12 celled; cells with 5-7 ovules in each. Capsule as described under the genus, 7 lines in diameter when closed, shallow, flattish above, slightly

262 convex beneath, circular in outline, smooth, pale brown with 10 valves and cells; when expanded 9-10 lines in diameter, uniformly pale brown inside; valves $2\frac{1}{2}$ lines long and $1\frac{1}{2}$ line broad. Seeds $\frac{1}{2}$ - $\frac{2}{3}$ line in diameter, globose, without a nipple, smooth, glabrous, grey.

Cape Division: Growing in white sand at Somerset Strand, near the shore of False Bay, Pillans..

This rare plant was discovered by Mr. N. S. Pillans in September, 1927, who very kindly supplied me with a specimen and a ripe capsule, in which I found only one seed in each cell, although each cell of the ovary has several ovules. From these seeds I raised a few plants from one of which the accompanying figure (Fig. 112) was made.

263 It seems to be infertile to its own pollen, as I pollinated four flowers with pollen from other flowers upon the same plant, but no fruit resulted. Pollen is shed in abundance among the crowded filaments of the stamens and on the top of the ovary.

Before it flowered I thought the long-lost *Mesembryanthemum helianthoides*, Ait., had been rediscovered, as the habit and foliage seemed to be quite the same as in that plant, which probably belongs to this genus, but when it flowered it proved to be quite distinct.

2. *A. helianthoides*, N.E.Br.-- Annual with stems several inches long and $1\frac{1}{2}$ - $3\frac{1}{2}$ lines thick, terete, with internodes 1- $1\frac{1}{2}$ inch long, glabrous, smooth, green, tinted with purple, especially about the nodes. Leaves opposite, not united at the base, $1\frac{1}{2}$ - $2\frac{1}{2}$ inches long, spatulate, with a flat, ovate, acute blade, 1- $1\frac{1}{2}$ inch long, tapering into a petiole $\frac{1}{2}$ - $1\frac{1}{4}$ inch long, dilated into an open sheath at the base, smooth, glabrous, neither dotted nor papillate. Pedicels at first terminal, becoming lateral, 6-7 inches long, $\frac{1}{2}$ -1 line thick, smooth, glabrous. Calyx with the base or ovary-part perfectly flat (truncate) and 5-angled, apparently 5-lobed to the base, glabrous; lobes subequal 10-12 lines long, 4-6 lines broad at the deltoid-ovate base, tapering into linear obtuse points, apparently not papillate. Corolla much like that of *Carpantaea pomeridiana*, 2 lines in diameter; petals very numerous, apparently in 4-5 series, spreading in different planes, slender, acute, yellow. Staminodes and stamens inflexed to the centre, yellow. Stigmas (according to Haworth) about 10, long, united below, subulate, recurved, puberulous under a lens, pallid. Ovary depressed.

Mesembryanthemum helianthoides, Ait., Hort. Kew., ed. 1, II, 193 (not 198 as quoted by authors); Haw. Rev. Pl. Succ., 161.

South Africa: Locality unknown, introduced into cultivation by Masson in 1774.

The above description is compiled from a drawing made by Ann Lee in 1776, now preserved in the British Museum, which, with Haworth's description, represents all that is known of this very distinct plant, as Aiton's description is inadequate.

Until it has been rediscovered and its fruit is known its genus must remain doubtful, but as its habit and foliage so closely accord with that of *Apatesia Pillansii*, I refer it to this genus for the present.

3. *A. Maughani*, N.E.Br.-- Annual $2\frac{1}{2}$ -6 inches high, with short, erect, or ascending branches. Leaves basal, opposite, $1\frac{1}{2}$ - $1\frac{1}{2}$ inch long and $1\frac{1}{2}$ -4 lines broad, spatulate-obovate or oblanceolate, ob-

263 tuse, flat or perhaps concave, tapering into a petiole that is dilated at the base into an open, flat sheath, glabrous, papulose. Pedicels erect in flower and fruit, slender, 1-5 inches long, $\frac{1}{2}$ - $\frac{3}{4}$ line thick, glabrous, not papulose. Calyx with the underside of the ovary-part slightly convex when in flower and flat and smooth when in fruit, unequally 5-lobed; two lobes entirely green, 3-7 lines long, linear or linear-spathulate from a broad base, the other three $2\frac{1}{2}$ -3 lines long, suborbicular or broadly ovate, with broad membranous margins, and a dorsal point 2-3 lines long. Corolla $1\frac{1}{4}$ - $1\frac{1}{2}$ inch in diameter in the withered flower seen; petals numerous, in 3-4 series, 6-7 lines long, $\frac{1}{2}$ - $1\frac{1}{3}$ line broad, linear, acute, yellow. Staminodes hair-like, tortuous, yellow. Stamens about 3 lines long, with yellow filaments and orange anthers. Style none; stigmas 7-8, about $1\frac{1}{2}$ - $2\frac{1}{2}$ lines long, filiform, tortuous. Ovary partly superior, conical at the top, with 7-8 cells. Capsule, when closed, 5-8 lines in diameter, circular in outline, flat and smooth beneath, conical above, with 7-8 valves and cells; valves reflexed when expanded, entirely pallid, or fuscous or brownish at the apical and blackish at the basal part within, including the expanding keels, which are closely contiguous below and about $1/3$ as long as the valve; their flanks or marginal parts spread out flat and adhere to the valve up to the margin, where they turn up into a sharp edge, and except the very short awn-like tips, which are closely applied to the valve, they adhere to the valve throughout; cells open, without cell-wings or a placental tubercle; cell-partitions (from the component parts being separated and inflated between) appearing very stout, with convex sides and produced at the centre into a cone of very acute points. Seeds somewhat compressed, roundish, $2/3$ line in diameter, microscopically granulate, pallid or greyish, dotted with darker grey or brown.

South Africa: Piquetberg Division, at Endekuil, Maughan Brown.

I place this plant under *Apatesia* with some doubt as it differs by the absence of a style, the ovary and capsule conical at the top and the awned expanding-keels. It requires further investigation when alive, as my description is made from dried material.

N. E. Brown

(To be continued.)

MESEMBRYANTHEMUM.

Gard. Chron. III. 100; 164. 1936.

MESTOKLEMA, N. E. Br.

164 Shrubs or shrublets, in one species with a treelike trunk, bushily and often intricately branched, sometimes (always?) with a tuberous rootstock, and the young branches minutely papulose, slightly rough to the touch when dried and pallid, and the flower cymes persisting, hardening and becoming subspinose, but are not pungent. Leaves opposite, not united at the base, often leaving a tooth-like projection on the stem when they fall away, triginous or subterete, minutely or microscopically papulose and glittering, bearing leaf-tufts in their axils. Flowers small, pedicellate, in terminal bracteate cymes that are 2-5-times dichotomously divided. Bracts small, leaf-like. Calyx subequally 5-lobed, small, leaf some of the lobes with narrow, membranous margins. Petals in one series, linear, often little longer than the calyx-lobes. Stamens numerous, collected into a cone, the inner bearded; no staminodes.

164 Stigmas 5, erect, shorter than the stamens, subulate, perhaps papillate. Ovary half-superior, conical or convex and ridged on the top. Capsule small, half superior, with 5 valves and cells; valves recurved when expanded, with the expanding-keels contiguous below, diverging above, usually dull orange or orange-brown, with rather narrow, membranous acutely-pointed wings; cells roofed with membranous cell-wings and without a placental tubercle. Seeds ovoid, smooth, brown.

Species 4.-- Natives of South Africa. The type of the genus being *M. tuberosum*, N.E.Br.

The name is derived from the Greek, *mestos*, full, and *klema*, a small branch, in allusion to the abundantly branched habit of the bushes.

Although I had held the opinion for many years past that the plants here dealt with formed a distinct genus, I was unable to deal properly with it for want of such material as I have through the kindness of Mr. R. A. Dyer, now had access to, and from which I have formulated the above generic characters.

Mestoklema is allied to *Delosperma*, and the type species (*M. tuberosum*) was referred to the latter genus by Dr. Schwantes, but erroneously, as it has not the generic characters of *Delosperma*, although South African botanists have accepted that generic determinations, apparently without examination. The two genera, however, differ at a glance, for the peculiar habit, very small flowers, and the persistent, hardened and subspinose cymes give the genus a very distinct appearance, while the important structure of the capsule is distinctly at variance with that of *Delosperma*, in which the cells are open, without cell-wings, and the expanding-keels different.

This genus is difficult to characterise from dried specimens as the species are similar in appearance, although probably easily distinguished when alive. Unfortunately, I have not been able to examine living material of them, so cannot make use of and contrast such characters as would at once appeal to the student having living plants before him. It is

165 not even known if other species than *M. tuberosum* and its variety have a tuberous rootstock. So that in compiling the key I have had to make use of such small absolute characters as dissection of the dried material afforded.

Key to the Species.

Pedicels 4-7 lines long; petals $1\frac{1}{4}$ - $1\frac{1}{2}$ line long, light magenta. 6. *albanicum*.

Pedicels 1-3 lines long.

Ovary-part of calyx about $1\frac{1}{2}$ line in diameter; corolla $4-4\frac{1}{2}$ lines in diameter, with petals $1\frac{1}{4}$ - $1\frac{1}{2}$ line long.
Cymes $\frac{2}{3}$ - $1\frac{1}{2}$ inch in diameter, with at about 7-12 flowers.

Petals coppery fulvous or some shade of magenta.

1. *tuberosum*.

1. *tuberosum* var. *macrorrhizum*.

Cymes $1\frac{1}{2}$ - $3\frac{1}{2}$ inches in diameter, with 15-50 flowers.

2. *copiosum*.

Ovary-part of calyx $\frac{3}{4}$ - $1\frac{1}{4}$ line in diameter; corolla about 3-3 $\frac{1}{2}$ lines in diameter, with petals $\frac{1}{4}$ - $1\frac{1}{4}$ line long.

Leaves 3-9 lines long.

Petals orange or yellow, Griqualand West and Namaqualand. 3. arboriforme.

Petals "purple" (some shade of magenta?). Albany. 4. elatum.

Leaves $1\frac{1}{2}$ -4 lines long; petals light magenta. 5. illepidum.

1. *M. tuberosum*, N.E. Br.-- A much branched shrublet, 9-18 inches high, with a large subglobose or lobed tuberous rootstock. Main branches tortuose, often intricately branched, 1-3 lines thick, with internodes 2-9 lines long, with young minutely papulose and pale greyish becoming smooth and purple-brown or brown with age. Leaves spreading or ascending-spreading and recurved at the tips, 4-9 lines pressed, subacute, minutely papulose, green. Cyme $\frac{1}{4}$ - $1\frac{1}{2}$ inch in diameter. Pedicels 2-3 lines long. Calyx with the shortly conical ovary part about $1\frac{1}{2}$ line in diameter; lobes about $1\frac{1}{2}$ line long, deltoid or oblong, obtuse. Corolla about $4\frac{1}{2}$ lines in diameter; petals about $1\frac{1}{4}$ - $1\frac{1}{2}$ line long, obtuse, reddish-fulvous and reddish on the back according to Haworth, but according to notes on labels varying from "salmony-pink" to "dark magenta." Stamens collected in a cone about $1\frac{1}{2}$ line long; filaments reddish, white at the base and the inner bearded; anthers white, ex Haworth. Stigmas about $\frac{1}{2}$ line long. Capsule about $1\frac{1}{2}$ line in diameter, in structure as for the genus.

Mesembryanthemum tuberosum, Lin. Sp. Pl., ed. I, p. 484, founded upon Dillen., Hort. Elth., p. 275, t. 207, f. 264; Haw., Obs., p. 271; Misc. Nat., p. 89; Synop., p. 252, and Rev., p. 179 also in Phil. Mag., 1826, p. 331, under *M. macrorrhizum*; Salm Dyck., Mesemb., 49, f. 2; Mag. Bot. and Gard., v. I, t. 6; Berger, Mesemb., p. 100, f. 13., III-IV. *M. spinosum*, O. Kuntze, Rev. Gen. Pl., v. 3; p. 109, not of Linne. *Delosperma tuberosum*, Schwantes in Mollers' Deutsch Gartn. Zeit., 1927, p. 258.

Uitenhage Division: Zwartkops River Valley, Zeyher 2608; Somerset Division: Near Brintjes Hoogte, MacOwan, 2095. Cradock Division: near Cradock, Cooper, 496. Middleburg Division: Middelburg Road, Kuntze. Orange Free State; near Fauresmith, Smith, 3916, 4036.

And probably also belongs here a plant from Albany Division, collected on Penrock Farm, 10-12 miles from Grahamstown, at 1500 feet elevation, labelled as having "purple or dark magenta flowers," Dyer, 1179.

This plant was introduced into cultivation in England over two hundred years ago, as it was figured by Dillenius in 1732, and was probably sent from Uitenhage Division. It is still in cultivation, but probably not very common.

If the figure in De Candolle, Pl. Grasses, t. 78, is a correct representation of the plant there named *M. tuberosum*, there must have been two species in cultivation under that name, because that figure represents a plant with stouter leaves, flowers that are nearly twice the size of those of *M. tuberosum*, and is stated to grow to $2\frac{1}{2}$ feet in height.

Mr. C. A. Smith notes on this labels that in the Fauresmith area

165 *M. tuberosum* is called "Donkie Vygie" because the tuberous rootstock is pawed out of the ground and eaten by Donkeys, who are fond of it.

Ver. *macrorrhizum*, N.E.Br.-- Plant $1\frac{1}{2}$ -2 feet high, with a large subglobose tuberous rootstock. Branches erect nearly straight. Flowers white. Otherwise as in the type.

Mesembryanthemum macrorrhizum, Haw., in Phil. Mag., 1826, p. 331; Salm Dyck, *Mesemb.*, 49, f. 3; N.E.Br. in Journ. Lin. Soc., v. XLV, p. 121. *M. megarrhizum*, Don, Gen. Syst., v. III, p. 145 (1834); Sonder in Fl. Cap., v. II, p. 441; Berger, *Mesemb.*, p. 101.

South Africa without locality, Bowie, who sent tubers of it to Kew in 1820, when he was collecting in the eastern part of Cape Colony, so it may have come from Uitenhage, Albany or Somerset Division.

I have not seen any wild specimen corresponding with Haworth's description and the drawing of his type of *M. macrorrhizum*, which is preserved at Kew. But in 1876 there was a plant at Kew cultivated under that name, of which I dried a specimen for Kew Herbarium, indicating on the label that it was certainly the same as the plant figured by Salm Dyck as *M. macrorrhizum*, so that it probably had white flowers, although I have not stated the colour on the label; I well remember it had a very large tuberous rootstock, and its branches are very erect and straight. In 1884 I dried another specimen of a plant identical with that of 1876 in every character, except that I have marked upon the label that the flowers were "coppery-red." This plant was sent to Kew by Mac Owan, and in spite of its erect, straight branches, I strongly suspect is the same as Mac Owan 2095, from Brintjes, Hoogte, which I have compared with the type of the Dillenian figure from which Linne described the plant and figure from which Linne described the plant and considered it to be identical with the latter. But whether the 1876 and 1884 specimens were from the same individual plant, I cannot now (1933) remember; if so, it indicates that colour of the flower may vary on the same plant; and if they were not it indicates that the straightness of the branches and their erect pose under cultivation is of no specific importance. So, as I have seen no South African specimen that agrees with the type figure of *M. macrorrhizum*, I assume it to be only a white-flowered variety of *M. tuberosum*.

2. *M. copiosum*, N.E.Br. -- Probably a small shrub or shrublet, the branches seen being 6-8 inches long, $1\frac{1}{2}$ -2 lines thick below, with internodes 206 lines long, minutely papulose and whitish when young, becoming first pale grey and finally smooth and brown with age. Leaves ascending-spreading, 5-8 lines long and about $\frac{1}{4}$ -1 line thick, trigonous, obtuse, not or scarcely apiculate, apparently slightly channelled down the face, very obtusely keeled on the back, microscopically papulose. Cymes $1\frac{1}{2}$ -3 $\frac{1}{2}$ inches in diameter, four or five times forked and rather densely many (15-50)-flowered. Bracts 1-2 lines long, stout and very obtuse at the slightly recurved apex. Pedicels 1-1 $\frac{1}{2}$ line long. Calyx with the ovary-part 1 $\frac{1}{2}$ -1 $\frac{1}{2}$ line in diameter, very shallowly obconic; lobes about 1-1 $\frac{1}{2}$ line long, deltoid. Corolla apparently about 4 lines in diameter; petals about 1 $\frac{1}{2}$ line long and $\frac{1}{4}$ -1 $\frac{1}{3}$ line broad, obtuse or acute. Stamens about $\frac{3}{4}$ line long. Stigmas 5-7, about 1 $\frac{1}{3}$ -1 $\frac{1}{2}$ line long, stout, acuminate. Ovary convex on the top. Capsule 1 $\frac{1}{2}$ line in diameter, obconic,. Otherwise as for the genus.

Herbert Division: Mazelsfontein, Anderson 720.

This inhabits the same region as *M. arboriforme*, and may have been mistaken for that species, but the larger and denser cymes of larger flowers readily distinguish it, and the leaves and bracts also appear to be more obtuse. From *M. tuberosum* its rather smaller and much more copious flowers at once distinguish it, their colour is not indicated on the label.

3. *M. arboriforme*, N.E.Br.-- Plant 9-18 inches in height, tree-like in habit, having a definite trunk "up to one inch in diameter," much and intricately branched. Main branches $1\frac{1}{2}$ - $2\frac{1}{2}$ lines thick, with internodes 3-6 lines long, rough from minute papulae and pallid or whitish when young, becoming smooth and purple-brown or blackish-brown with age. Leaves $1\frac{1}{2}$ -7 lines long, $\frac{1}{4}$ -1 line thick, subteretely trigonous, slightly compressed, obtuse and often slightly recurved at the apex, microscopically papulose under a strong lens, green. Flowers very small, in terminal, dichotomous cymes $1\frac{1}{4}$ -3 inches in diameter. Pedicels $\frac{3}{4}$ - $1\frac{1}{2}$ line long. Calyx with the ovary-part shortly obconic and about $\frac{1}{4}$ -1 line in diameter; lobes $\frac{1}{4}$ -1 line long, deltoid, obtuse, some with membranous margins. Corolla about 3- $3\frac{1}{2}$ lines in diameter; petals 1- $1\frac{1}{4}$ line long, $\frac{1}{4}$ line long, linear, obtuse, on the labels with the dried specimens stated to be "pale orange," "orange-bronze," and "yellow." Stamens about $\frac{1}{2}$ - $2/3$ line long, white, with the anthers longer than the filaments. Stigmas $\frac{1}{4}$ - $1/3$ line long, subulate. Top of the ovary flattish-conical. Capsule 1- $1\frac{1}{2}$ line in diameter. All other characters as for the genus.

Mesembryanthemum arboriforme, Burchell, Trav., v. I. p. 343 (1822), N.E.Br. in Journ. Linn. Soc., v. XLV, p. 124.

Griqualand West: Hay Division; between Wittewater and Rietfontein, Burchell 2004 (the type); near the Diamond Fields, Shaw, 14; Prieska Division; near Prieska, Bryant 598. Great Namaqualand: Great Karasberg; Narudas Sud, Pearson 8569, and Sandstone plateau on summit of Long Hill, east of Krai Kluit, 6,000 feet. Pearson 8589.

I do not know if this plant has a tuberous rootstock or not, as no collector mentions it on the label with the specimen, nor has Burchell made any note about it in his manuscript catalogue at Kew. Pearson has labelled 8589 as being a "bush 1-3 ft.", so that the Namaqualand plant may grow taller than it does in Griqualand West and Prieska. But I can detect no difference between the specimens, apart from size.

4. *M. elatum*, N. E. Br. -- A shrub 2-4 feet high, with the main branches ascending, 2-3 lines thick below, with internodes 5-12 lines long, when young very minutely papulose and pale greyish, becoming smooth and brown with age, but in the dried state the bark is longitudinally wrinkled. Leaves ascending-spreading in or spreading, 4-7 lines long, $2/3$ - $\frac{3}{4}$ line thick, compressed-trigonous, flat or slightly channelled down the face, keeled on the back, recurved at the apex, which is dorsally shortly acute or obtuse as viewed sideways, microscopically papulose. Cymes 1- $1\frac{1}{4}$ inch in diameter, densely 15-20-flowered. Pedicels 1-3 lines long. Bracts very small, about $\frac{1}{2}$ - $\frac{3}{4}$ line long and apparently soon falling away. Calyx with the shortly obconic ovary-part $1\frac{1}{4}$ - $1\frac{1}{2}$ line in diameter; lobes about $\frac{1}{2}$ line long, deltoid, obtuse. Corolla 3- $3\frac{1}{2}$ lines in diameter; petals scarcely 1 line long, obtuse, "purple" probably of some shade of magenta. Stamens about $\frac{1}{4}$ line long. Stigmas scarcely $1/2$ line long. Capsule $1\frac{1}{4}$ - $1\frac{1}{2}$ line in diameter, soon falling

165 away. In other details as for the genus.

Albany Division: Fish River Valley; between Committees and Hunts Drift, 1,500 feet, Dyer 890 (the type), and Hunts Drift, Rylling, 975.

This is well distinguished from allied species by its taller habit and compact cymes of smaller flowers.

5. *M. illepidum*, N. E. Br.-- Plant about 9-10 inches high, glabrous, much branched. Main branches $2\frac{1}{2}$ -4 lines thick at the lower part, with internodes 3-6 lines long, when young minutely papulose and whitish in the dried state, becoming brown with age. Leaves small, $1\frac{1}{2}$ -4 lines long, $\frac{1}{2}$ - $\frac{3}{4}$ line thick, compressed-subterete, obtuse, somewhat recurved at the apex, microscopically papulose, green. Flowers very small, in terminal bracteate cymes, with bracts 1-1 line long. Pedicels 1-2 lines long. Calyx with the ovary-part 1- $1\frac{1}{2}$ line in diameter; lobes $\frac{1}{4}$ line long, deltoid, obtuse. Corolla apparently about 3 lines in diameter; petals 1 line long, $1/5$ - $1/4$ line broad, obtuse, "light magenta." Stamens about $\frac{1}{2}$ line long, apparently white. Stigmas approximately $\frac{1}{4}$ line long, subulate. Capsules about $1\frac{1}{2}$ line in diameter. In all other characters as for the genus.

Bedford Division: on the road from Grahamstown to Bedford, in karroid veld, Dyer 2336 (the type). Albany Division: karroid area off the Cradock Road, 7-8 miles from Grahamstown, Britten 38.

In appearance the branches of this plant are much like those of *M. tuberosum*, but the leaves and flowers are smaller. Britten 38 appears to belong here, but sometimes forms a bush 14 inches or more high. Its rootstock is formed of a cluster of stout, fusiform, tuberous roots, $\frac{1}{2}$ inch or more thick.

6. *M. albanicum*, N. E. Br.-- Plant about 9-15 inches high, glabrous,. Main branches apparently decumbent at the base, then erect or ascending, branching, 1- $1\frac{1}{4}$ line thick below, with internodes mostly 6-9 lines long, minutely papulose and ash-grey when young, becoming smooth and brown with age. Leaves spreading, more or less recurved at the tips, 3-5 lines long, $\frac{3}{4}$ - $1\frac{1}{4}$ line thick, apparently flattened or slightly channelled on the face and obtusely keeled on the back, probably compressed, minutely papulose. Cymes 1-2 $\frac{1}{4}$ inches in diameter, lax. Pedicels 4-7 lines long. Calyx subequally 5-lobed, the ovary-part about $1\frac{1}{2}$ line in diameter, shortly obconic; lobes 1- $1\frac{1}{4}$ line in length, deltoid, obtuse. Corolla apparently about $3\frac{1}{2}$ lines in diameter; petals $1\frac{1}{4}$ - $1\frac{1}{2}$ line long, linear, obtuse, "light magenta." Stamens about 1 line long. Stigmas about $\frac{1}{2}$ line long, subulate; top of the ovary convex. Capsule 2-2 $\frac{1}{2}$ lines in diameter. In all others characters as for the genus.

Albany Division: seven miles from Grahamstown along the Cradock Road, 3,000 feet alt. Dyer 1308. MS. of the late Dr. N. E. Brown.

Index to Genera and Species

Acaulon 300,301

rosulatum 302

Acrodon 160

bellidiflorus 160

Aloinopsis 302,314,315

albinota 311

albipuncta 313

aloides 318

aloides v. *striata* 318

cibdela 313

Dyeri 319

Orpenii 325

Peersii 320

rosulata 302

rubrolineata 319

vittata 316

Amoebophyllum 82,226,232

angustum 233

Gurichianum 233,234

Rangei 233,234

roseum 234

Antimima 292

dualis 292

Apatesia 159,342,345

helianthoides 159,343,344

Maughani 343,344

Apatesia (Cont'd.)

Pillansii 159,342,343,344

Aptenia 79,253

cordifolia 254

cordifolium 253

Argeta 182

petrensis 183

Argyroderma 37,40,81,84,128,293

crateriforme 129

duale 39,130,292

Margaretae 171,258

Margaritae 130,258

necopinum 39,130,292,293

roseatum 39,130

subalbum 38,39,130

testiculare 37,38,39,128,129,130

testiculare v. *luteum* 38,130

testiculare v. *Pearsoni* 38,130

testiculare v. *roseum* 38,129,130

Aridaria 78,83,235

laxa 238

Rabei 238

resurgens 248

Aspazoma 82, 232

amplectens 232

Bijlia 261,262

Bijlia (Cont'd.)

cana 261,262

Bolusanthemum 262

Tugwelliae 261

Carpanthea 80,223,240

pomeridanum 223

Carpobrotus 83

Cephalophyllum 84,85

dubium 76

Cerochlamys 261

Cheiridopsis 80,85,132,133,134,
136,141,147,155,269

bibracteata 134

bifida 134,141

candidissima 134

carnea 134,136

Caroli-Schmidtii 135,136

cigarettifera 133,135,137

cuprea 135,138

denticulata 135

denticulata v. *glauca* 135

difformis 135

inconspicua 135,139

inspersa 135

lecta 135

Marlothii 135,139,142

Meyeri 135,141

parvula 135

Cheiridopsis (Cont'd.)

Pearsonii 135,142

pecularis 133,135,141,142

pressa 135

purpurascens 135

robusta 135

Roodiae 136,144

rostrata 134,136,141,144

rostratoides 136

tuberculata 134,136,145

ventricosa 132,136,146

Chrysanthemum

africanum triangulari folio 335

aizoides africanum teretifolium 340

aizoides africanum triangulari
folio flore careno 341

aizoides africanum triangulari
folio flore purpureo 341

Circandra 285

serrata 285

Cleretum 80,184

apetalum 184

criniflorum 184

gramineum 184

papulosum 184

pinnatifidum 184

puberulum 184

Conicosia 80,83,158,326,327,335,339

affinis 248,330,337

Conicosia (Cont'd.)

Bijlii 329,336
brevicaulis 248,329,332
capensis 248,329,331,332,333,
334,335
communis 329,331,332,333,334,
335
elongata 248,330,337,339
elongatum 340
fusiformis 248,327,330,335,340
Muirii 248,327,329,335,336,337
pugioniformis 248,327,329,330,
331,333,334,341
pulliloba 329,334
robusta 248,330,339
Roodiae 248,327,330,336,338,
339

Conophyllum 266,268,269

clivorum 275
cognatum 275
dissitum 274
moniliforme 266
nanum 276
pisiforme 267
proximum 274

Conophytum 12,30,31,44,45,47,68 77,81,86,87,99,105, 108,112,113,118,127, 141,158,161,162,174, 184,227

advenum 89
aggregatum 59

Conophytum (Cont'd.)

albertense 53,96
albescens 100,101,102
altile 64,65
andausanum 162
Angelicae 89
apiatum 66,100
assimile 90
Batesii 90
bilobum 66,67,89,94,99,100,104,
112,113,169
breve 91
Brownii 163
calculus 50,91
catervum 59
cauliferum 67,101,184
cibdelum 88,91
clarum 162
Comptonii 163
dispar 92
diversum 162,163
ectypum 92,163,165
elegans 184
Elishae 67,101,112,113,169
exsertum 100,101,102
fibuliforme 49
ficiforme 63,92
fimbriatum 49
flavum 164,184

Conophytum (Cont'd.)

fraternum 53
Friedrichiae 298
globosum 46,50
gracilistylum 68,93,94,100,162
gratum 54
hahlenbergense 94,100,102
hians 164
inornatum 93
Johannis Winkleri 93
juncundum 47,49,51
klaverense 93
kubusanum 164,165
labyrintheum 60,61
Leipoldtii 48,94
leviculum 47,55,59,60,94
limbatum 165
longistylum 295,296
longum 298
luteum 296
Marlothii 162,165,166
Maughani 296,297,298
Meyeri 94,99,113,166
minimum 55
minusculum 46,61,98,162,169
minutiflorum 91,93,94,95
minutum 47,49,51,95

Conophytum (Cont'd.)

misellum 166
Muiri 166
mundum 58,59
Nevillei 47,53,57,96
novellum 162,167
notabile 296
notatum 95
nuciforme 67,100
obcordellum 57,95
obmetale 56
obscurum 167
odoratum 64,65
oviforme 47,49,52,105
Pageae 50,91,95
pallidum 65
parvipetalum 47,53,58
pauxillum 61
Pearsonii 95,96,99
Pearsoni v. minor 96
perpusillum 56
petraeum 62
pictum 60,88
picturatum 167
pilosulum 46,48,87,95,127
piluliforme 54,55
pisinnum 49,98

Conophytum (Cont'd.)

placitum 63,65,96,161,162
polulum 61,161,162
praecinctum 56
praeparvum 162,168
praesectum 298
pubescens 128
Purpusii 96
pusillum 60,61
quaesitum 65,66,100
retusum 168
Roodiae 100,103
rufescens 297
saxetanum 47,49,50,52,53,97,
166
scitulum 62
Shandii 128
signatum 47,55,59,60,88
sororium 101,103
spirale 97
subfenestratum 297
subrisum 47,50,51,95
tantillum 97, 169
Taylorianum 98
translucens 47,53,54
truncatellum 91,96,161,296
truncatum 54,55
turrigerum 48,65,68,100

Conophytum (Cont'd.)

uvaeforme 63
vagum 62,89
viridicatum 47,49,53
viridicatum v. punctatum 98
Wettsteinii 47,49,51,95,96,99
Whettsteinii 98,113
Wiggettae 99
Cryophytum 78,79,86,223,235,239,245
Aitonis 240,253
arenarium 244
Barkleyi 263
Barklyi 240,245
Bijliae 263
Burchellii 241
clandestinum 241,242
conjectum 241
crassifolium 243
crystallinum 240,242
Fenchelii 243
gibbosum 262
grandiflorum 240,242,263
grandifolium 263
inachabense 246
Maxwellii 247
nanum 263
neglectum 247
nodiflorum 247,263

Cryophytum (Cont'd.)

- paulum 246
- Rogersii 246,264
- sessiliflorum 245
- Wilmaniae 247,264
- Dactylopsis 82,226,228,229
 - digitata 229,230
- Deilanthus 299,319
 - Peersii 320
- Delosperma 80,84,181,226,346
 - tuberosum 347
- Depacarpus 282
 - tinctus 282
- Derenbergia 112
- Dicrocaulon 282
 - Pearsoni 282
- Didymaotus 84,114,149
 - lapidiformis 150,151
- Dinteranthus 171,255,256
 - inexpectatus 256
 - Maragaretae 258
 - Margaretae 255
 - microspermus 171,255,256
 - Pole Evansii 256
 - puberulus 256
- Diplosoma 225
 - Leipoldtii 226
 - retroversum 225,226,227

Disphyma 84

- australe 259,277
- Dolosperma 78
- Dorotheanthus 184
 - criniflorus 184
 - gramineus 184
- Drosanthemum 277,278,283
 - hispidum 283
- Eberlanzia 278
- Echinus 278,284
 - edentulus 284
- Ectotropis 160
 - alpina 160
- Enarganthe 284,289
 - octonaria 284,290
- Erepsia 78,80,84,86,291
 - viridis 291
- Fenestraria 83,107,184
 - aurantiaca 185
 - rhopalophylla 185
- Frithia 83
- Gibbaeum 15,40,41,45,81,83,87,95,
108,114,117,118,120,127,
178,258
 - album 120,121,122,123
 - album v. roseum 178
 - angulipes 178
 - argenteum 15,41
 - dispar 121,123,179

Gibbaeum (Cont'd.)

geminum 42,120,124,179
gibbosum 43,44,118,119,122
luteoviride 122,124
Marlothii 258
molle 119,120,124
Muiri 119,121,125
perviride 43,118,119,122,126
perviride v. B. 124
perviride v. luteoviride 43, 124
pilosulum 120,126
pubescens 41,42,118,119,121,
127,128,180
shandii 42,43,121,128,180

Glottiphyllum 21,30,45,81,85,108,
135,154,158,185,
188,213,220,221,
226,240

angustum 23,192,203,204
apiculatum 191,202
arrectum 27,192,195
carnosum 193,194,210
concauum 190,191,203,204
cruciatum 27,190,191,197,199
cultratum 25,212,213,214
depressum 23,193,194,207,214,
215,216
difforme 28,29,190,195,197,198
erectum 187,191,208,209
fragrans 188,194,200,216,217,
218
grandiflorum 23,193,200,208,209

Glottiphyllum (Cont'd.)

hamatum 208
latum 24,25,186,187,192,200,201,
211,212,213,214,215
latum vars. 192
latum v. cultratum 212,215
linguiforme 23,186,194,216
longipes 190,198,199
longum 22,23,25,26,186,191,200,
205,206,207,208,215
longum v. hamatum 191,204,205,207
Marlothii 193,194,200
Muirii 187,193,209,210
Neillii 194,218
obliquum 24,25,212,213
ochraceum 29,85,190,219
praepingue 27,192,193,199,200, 201,
203
proclive 193,205
pustulatum 22,24,187,188,206,208,
209
regium 221
salmii 27,192,193,199,200,208
semicylindricum 28,29,190,196,200
suave 190,192,194,215,216
subditum 191,197,201
taurinum 26,193,204
uncatum 25,26,192,205

Gymnopoma 222

tripolium 222,223

Hereroa 262

Tugwelliae 261

Hydrodea 78,86,250,252

cryptantha 251

Hampdenii 252

Hymenogyne 79,280,342

calycinus 236

canaliculatus 235,236,237

carneus 236,237

caudatus 236,239

commutatus 235,236,238

fragilis 236,237

glabra 248

grossus 236,239

laxus 236,238

longispinulus 236,238

oculatus 236,237

Rabei 236,238

salmoneus 235,236,237

stephensiae 248

tenuiflorus 236,237

viridiflorus 236,237

Juttadinteria 262

Tugwelliae 261

Khadia 300,321

acutipetala 321,322,323

Beswickii 322,323

Khadia (Cont'd.)

Nationae 321,323

Nelsoni 322, 323

Lampranthus 284,293,341

acutifolius 293

aduncus 293

altistylus 293

amoenus 293

aureus 293

bicolor 293

brachyandrus 293

Brownii 293

caespitosus 293

calcaratus 294

capillaceus 294

coccineus 294

Comptonii 294

conspicuus 294

coralliflorus 294

curvifolius 294

cyathiformis 294

debilis 294

deflexus 294

diffusus 294

dilutus 294

disgregus 294

diutinus 294

Lampranthus (Cont'd.)

Dregeanus 294
drepanophyllus 294
Dyckii 294
emarginatoides 294
emarginatus 294
erratus 294
explanatus 294
falcatus 294
falciiformis 294
filicaulis 294
flexifolius 294
flexilis 294
formosus 294
Framesii 294
furvus 294
glaucooides 294
glaucus 294
glomeratus 294
gracilipes 294
Guthriæ 294
Haworthii 294
Henricii 294
imbricans 294
Immelmaniae 294
inaequalis 294
laxifolius 294
leptaleon 294

Lampranthus (Cont'd.)

Lerouxiae 294
longistamineus 294
lunatus 294
macrocarpus 294
magnificus 294
marcidulus 294
maturus 294
matutinus 294
microstigma 294
multiradiatus 284, 294
multiseriatus 294
mutans 294
parcus 294
pauciflorus 295
paucifolius 295
Peersii 295
perspicuus 295
Pittenii 295
plautus 295
Pocockiae 295
polyanthos 295
productus 295
promontorii 295
reptans 295
rupestris 295
Rustii 295
saturatus 295

Lampranthus (Cont'd.)

scaber 295
sociorum 295
spectabilis 295
spiniiformis 295
Stayneri 295
stenopetalus 295
sternus 295
stipulaceus 295
swartbergensis 295
tegens 295
tenuifolius 295
tulbaghensis 295
turbinatus 295
vallis-gratiae 295
Vanzijliae 295
variabilis 295
verecundus 295
viatorum 295
Watermeyerii 295
Woodburniae 295
Wordsworthiae 295
Zeyheri 295
zygophylloides 295

Lapidaria 256, 257

Margaretae 255, 257

Leipoldtia 285, 286, 287

Leipoldtia (Cont'd.)

constricta 285

Lithops 30, 33, 45, 77, 81, 105, 107, 114,
123, 158, 169, 227

bella 36, 37, 170

damarana 36, 37, 109

Eberlanzii 108

Francisci 108

Friedrichiae 32, 109, 112

Fulleri 169

fulviceps 31, 33, 109

Julii 109

karasmontana 109, 169

Lericheana 109, 170

Lesliei 31, 34, 106, 107, 108, 110

Marlothii 110, 184

marmorata 35, 111

Mundtii 170

optica 31, 36, 111

pseudotruncatella 34, 107, 111, 171

pseudotruncatella v. alta 170

rubra 111

Ruschiana 111, 119

Ruschiorum 119, 120, 171

terricolor 35, 112

turbiniiformis 32, 106

Vallis Mariae 112

Litocarpus 254

cordifolius 254

Lycoperdiastrum 50

soboliferum altius radicatum 50

Macrocaulon 159

Candollii 159

Malephora 161

mollis 161

Mesembryanthemum

abruptum 288

acinaciforme 73

acutifolium 293

acutipetalum 322,323

acutisepalum 248

adscendens 24,26,207,212,213

aduncum 293

aequilaterale 18

aggregatum 59

Aitonis 240

albertense 53,96

albicuta 280

albinotum 311

albipunctum 313

albipunctum v. majus 313

aloides 313,315,318

alsinifolium 241

atile 64

Mesembryanthemum (Cont'd.)

amoenum 293

amplectens 232

amplexum 279

ampliatum 279

androaceum 279

angeiforme 93

Angelicae 89

angulatum 240,253

angulatum v. ovatum 253

angulipes 179

angustum 23,26,204

angustum v. heterophyllum 26,30,
186,205,207

angustum v. pallidum 26,204

apetalum 184

apiatum 66

apidiforme 150

aquosum 248

arboriforme 349

arenosum 248

armatum 279

articulatum 248

assimile 90

Astridae 305

atratum 279

atrocinctum 280

aureum 1,293

Mesembryanthemum (Cont'd.)

barbatum 283
Barklyi 245
Barklyi v. obtusifolium 245
Barnardii 279
bellidiflorum 160
Beswickii 322
bibracteatum 134
bicolor 293
bicoloratum 279
bicolorum 327,340
bicorne 249
bidentatum 29,196,197
bifidum 10,134
bigibberatum 29,186,197
Biljiae 279
bilobum 66
blandum 1
Boehmerianum 97
Bolusii 11,37,123,148,315
brachyandrum 293
brevicaule 248,332
brevipes 131,132
Brownii 1,293
caducum 248
caespitosum 293
calamiforme 10,73
calcaratum 294

Mesembryanthemum (Cont'd.)

calcareum 2,304,306
calculus 50,91
calculus v. minutiflorum 94
calycinum 236
campestre 292
canaliculatum 236,237
candidissimum 134
Candollii 159
caninum 262
canum 30,198,260,261,262,320
capillaceum 294
capitatum 248,331,332,333,334
carinans 2,157,158
carneum 237
carolinense 310
Caroli-Schmidtii 137
catervum 59
caudatum 239
Chauviniae 93
chrysoleucum 267
cibdelum 313
cigaretteriferum 138
ciliolatum 279
clandestinum 241
clavellatum 249
clavulatum 248
cleistum 279

Mesembryanthemum (Cont'd.)

clivorum 275
coccineum 1,19,294
cocinnum 304
cognatum 275
commutatum 230
compactum 155,225,259,260
Comptonii 294
comptum 279
concinnum 2
connatum 279
conspicuum 294
Cooperi 4
coralliflorum 294
corallinum 248
cordifolium 254
coriarium 248
coruscans 340
crassipes 307
crassulifolium 279
crateriforme 129
criniflorum 184
cruciatum 26,27,28,198,199
cryptanthum 251,252
cryptopodium 67
crystallinum 19,73,74,242
crystallinum v. annuum 242

Mesembryanthemum (Cont'd.)

crystallinum v. grandiflorum 243
crystallinum v. vienne 242
crystallophanes 241
cupreum 139
cultratum 25,212,214
curvifolium 294
cyathiforme 294
dactylinum 248
damaranum 109
damarum 37
debile 294
deceptum 279
decurrens 279
deflectum 279
deflexum 294
Dejagerae 279
deltoides 1,284
denticulatum 135
denticulatum v. candidissimum 134
denticulatum v. glaucum 135
depressum 23,25,212,214
difforme 21,28,29,30,73,135,195,
196,197
diffusum 294
digitatum 230
digitiforme 230

Mesembryanthemum (Cont'd.)

- dimorphum 248
dinteri 248
displosum 280
dissitum 274
diutinum 294
diversipapillosum 248
dolabrilforme 10
Dregeanum 294
drepanophyllum 294
duale 39,292
dumosum 280
Dyckii 294
Dyeri 279
Eberlanzii 108
edentulum 284
edule 18,73
elineatum 279
Elishae 67
elongatum 248,253,337,338
elongatum var. B. 337
elongatum var minus 337,339
emarginatoides 294
emarginatum 294
enormus 280
evolutum 12,282
exacutum 279

Mesembryanthemum (Cont'd.)

exiguum 135
exile 279
expansum 223,250
explanatum 294
faciforme 92
falcatum 1,294
falciforme 1,294
familiare 96
fastigiatum 248
Fenchelii 243
Fergusoniae 279
ferrugineum 110
fibuliforme 49
ficiforme 63,64
filicaule 294
filipetalum 279
fimbriatum 49,53
firmum 279
fissum 115,116
flaccidum 294,342
flavens 279
flexifolium 294
flexile 294
floriferum 280
foliis difformeibus 196
foliis difformibus 28,29,195

Mesembryanthemum (Cont'd.)

foliis linguiformi longiore 26
folio linguiforme longiore 213
folio linguiformi angustiore 25, 212
folio linguiformi latiore 24, 212
folio linguiformi longiore 206
folio scalprato 24, 217
formosulum 280
formosum 294
Forskahlia 248
Fourcadei 279
Fragrans 23, 218
Framesii 279, 294
Francisci 109
fraternum 18, 54
Friedrichiae 14, 109
fulviceps 33
furvum 294
fusiforme 248
fusiformis 340
geminum 279
geniculiflorum 73, 74
Gessertianum 249
gibbosum 44, 118, 126
glabrum 5

Mesembryanthemum (Cont'd.)

glaciale 242
glareosum 249
glaucoides 294
glaucum 294
glebula 94
globosum 50
glomeratum 72, 294
Goodiae 279
gracilipes 294
gracilistylum 68
gramineum 184
grandiflorum 23, 209
grandifolium 244
granulatum 2, 157
granulicaule 249
gratum 54
grossum 237, 239
Gurichianum 234
Guthriae 294
gymnocladum 248
Haeckelianum 253
hahlenbergense 102
hamatile 279
Haworthii 1, 294
Heathii 6, 75, 115

Mesembryanthemum (Cont'd.)

hebes 280
helianthoides 150,344
Henricii 294
herberum 3
herbeum 4
Herrei 279
heteropetalum 1
heterophyllum 26,29,202,207,
220
hexamerum 279
hirtum 4
hispidum 1,283
Hookeri 33,35
Hugo-Schlechteri 305
Hutchinsoni 279
imbricans 294
Immelmaniae 294
inachabense 246
inaequale 294
inclaudens 19
inclusum 288
incurvatum 279
inexpectatum 257
insidens 279
inspersum 135
integrum 291,292
intervallare 289
intervallaris 284,289

Mesembryanthemum (Cont'd.)

iteratum 279
Johannis Winkleri 93
jucundum 51
jugiferum 64
Julii 109
junceum 249
Juttae 249
karasmontana 109
karooicum 292
Kuntzei 249
labyrinthum 60
lacerum 160
lanceolatum 241
lanceum 250
lacunatum 280
lapidiforme 11,17
latens 279
latum 24,25,212,213,295
latum var. B. 213
latum var. breve 25,212,213
laxifolium 294
laxipetalum 279
lectum 135
Leipoldtii 279
lene 279
leptaleon 294

Mesembryanthemum (Cont'd.)

leptarthron 249
Lericheanum 109
Lerouxiae 294
Lesliei 13,14,15,35,107,110
leviculum 59,94
lineare 1
linguaeforme 24,212
linguae forme v. assurgens 212
linguaeforme v. prostratum 212
linguaeforme v. rufescens 214
linguaeforme v. subcruciatum
212
linguaiforme v. attollens 205
linguaiforme v. uncatum 205
lingueforme 25
linguiforme 17,21,24,25,26,73,
186,217
linguiforme var. d. 206
linguiforme var. g. 212
linguiforme var. y. 25
linguiforme v. adscendens 212
linguiforme v. angustum 204
linguiforme v. cultratum 212
linguiforme v. declive 212
linguiforme v. depressum 212
linguiforme v. flaccidum 214
linguiforme v. fragrans 218
linguiforme v. grandiflorum
209

Mesembryanthemum (Cont'd.)

linguiforme v. heterophyllum 204,205
linguiforme v. latum 24,212
linguiforme v. longum 206
linguiforme v. obliquum 212
linguiforme v. pustulatum 206
linguiforme v. scalpratum 217
linguiformi lingiore 207
locale 31
longipes 279
longispinulum 236,238,239
longistamineum 294
longistylum 293
longum 6,10,26,75,206,207,212,213
longum v. angustius 208
longum v. attollens 205
longum v. declive 25,186,212,214,
215
longum v. flaccidum 26,207,212,215
longum v. purpurascens 208
longum v. uncatum 25,205
loratum 250
loreum 73
lucidum 24,26,186,212,213,217,226
lunatum 294
luteoviride 43,118,119,124
luteum 1
macellum 3,4
macrocarpum 294

Mesembryanthemum (Cont'd.)

macrorhizum 347,348
magnificum 294
magnipunctatum 153,154,262
magnipunctatum v. affine 155
magnipunctatum v. diplomis
154

Mahoni 3,4

maleolens 279

malleoliforme 96

Margaritae 130,258

marginatum 36

marmoratum 14,36

matutinum 294

Maxwellii 279

medium 24,210

megarhizum 348

melanospermum 249

mentiens 249

Meyeri 279

micans 340

micranthon 249

micropetalum 279

microspermum 171,256

microstigma 294

minimum 56

minusculum 61,96

minutiflorum 94

Mesembryanthemum (Cont'd.)

minutum 49,53,57,95

mitratum 273

molle 161,327,335

moniliforme 266

mucronulatum 249

multiflorum 1

multipunctatum 134

multiradiatum 1,284,294

multiseriatum 294

mutans 294

muticum 279

namaquanum 280

nanum 54,68,105

Nationae 323

necopinum 39

Nevillei 57

niveum 280

nobile 155,259,260

noctiflorum 73,74

nodiflorum 73,74,247

nuciforme 56,67

obconellum 57,58,95

obcordellum 57,58

obliquum 25,212

obmetale 56

ochraceum 29

Mesembryanthemum (Cont'd.)

octojuge 285,287
octonaria 290
octonarium 284
octophyllum 38,40
octophyllum var. B. 39
octophyllum v. roseum 38
oculatum 237
odoratum 64
optatum 156
opticum 14
opticum v. rubrum 111
Orpenii 19,20,325
oviforme 10,52,105
Pageae 50
pallens 250
pallidum 65,294
pansifolium 280
papillatum 280
papulosum 184
parvibracteatum 280
parviflorum 249,295
parvipetalum 59
parvulum 135
parvum 280
pauciflorum 295
paucifolium 295

Mesembryanthemum (Cont'd.)

pauxillum 61
Pearsonii 38
Peersii 295
pellanum 279
perforatum 280
perpusillum 56
perspicuum 295
perviride 43,118,119,124,126
perviride var. 43
Pfeilii 249
phylicoides 280
pictum 60
pilosulum 6,48,75
piluliforme 8,10,54,59
pinnatifidum 184
piscodorum 280
pisiforme 267
pisinnum 49
Pittenii 295
placitum 65
Pocockiae 295
Pole-Evansii 117,256
polyanthon 72,295
polyanthum 1
pomeridianum 6,69,74,75,248,340
praecox 294

Mesembryanthemum (Cont'd.)

praepingue 27,197,201,202
 pressum 135
 productum 295
 promontorii 295
 pronum 280
 prostratum 280
 proximum 11,12,272,274
 pseudotruncatellum 10,13,14,34,
 111
 puberulum 184
 pubescens 15,41,118
 pugioniforme 73,248,327,328,331,
 333,334,336,337,340
 pugioniforme florea mplo stram-
 ineo 331
 pugioniforme v. bienne 333
 pugioniforme v. carneum 341
 pugioniforme v. purpureum
 341
 pulchellum 282
 pumilum 280
 purpurascens 135
 purpusii 96
 pusillum 60
 pustulatum 24,206
 pustulatum v. lividum 206
 pygmaeum 12,138,282
 pyropeum 1

Mesembryanthemum (Cont'd.)

quadrifidum 145
 quesitum 66
 ramulosum 136
 rapaceum 236
 recumbens 20,21
 reductum 280
 relaxatum 250
 reptans 295
 resurgens 248
 retroversum 226
 rhopalophyllum 15,36,107,185
 robustum 135,142
 roseatum 130,279
 roseum 72
 rostratum 10,73,145,146
 rostratum v. brevibracteatum 134
 rostrum ardeae referens 145
 rosulatum 302,314,315
 rubrolineatum 319
 rufescens 23,214,215
 rupestris 295
 rupicolum 278
 Ruschianum 111,119,122
 Ruschii 111
 Ruschiorum 111,120
 Rustii 295

Mesembryanthemum (Cont'd.)

Salicornioides 249
salmii 27,188,199,200
Salmii v. angustifolium 199
Salmii v. decussatum 199
Salmii v. elongatum 199
Salmii v. semicruciatum 199
salmoneum 236,237
saturatum 295
saxetanum 52
saxicolum 280
scabrum 295
scalpratum 24,186,217
Schlechteri 280
Schlichtianum 249
Schwantesii 2
scitulum 63
scundum 248
scutatum 267
semicylindricum 21,28,29,196,
197
senarium 280
separatum 279
serratum 24,286
serratum flore acetabuliformi
luteo 286
sessiliformum 245
sessiliflorum v. album 241

Mesembryanthemum (Cont'd.)

Shandii 6,42,75
signatum 61
simile 249
simile var. namaquense 249
simulans 11,17,18,123,149
Sladenanum 249
sociorum 295
socium 40
sororium 154
sp. 6, 75
spathulatum 308
spectabile 295,340
spiniforme 295
spinosum 347
splendens 73
staminodes 17
staminodiosum 280
Stayneri 295
stellans 280
stenopetalum 295
stenum 295
stipulaceum 294,295
styliferum 280
stylosum 66
subalbum 38,280
sublunatum 280

Mesembryanthemum (Cont'd.)

subnodosum 249
subrisum 51
succulentum 280
suppositum 161
surrectum 30,221
surrectum var. B. 221
swartbergense 295
taurinum 26,204
Taylorianum 98
tegens 295
tenue 249,294
tenuiflorum 237
tenuifolium 74,295
testiculare 10,16,18,38,39,
40
testiculare var. y. 39
testiculatum 38
thecatum 52
Throthai 249
tinctum 282
tortuosum 73
translucens 280
tricolor 1
triflorum 280
tripolium 223
triquetrum 280
triticiforme 278

Mesembryanthemum (Cont'd.)

truncatellum 31,33,34,49,51,55,
99,170
truncatum 33,34,55
tuberculatum 146
tuberosum 347,348
Tugwelliae 261,262
tulbaghense 295
turbinatum 295
turbiniforme 13,32,33
umbellatum 74,276,277,281,282,283
uncatum 25,205
uncinellum 292
unidens 21
uvaeforme 63
valens 279
vallis-gratiae 295
Vallis Mariae 112
Vanzijliae 295
variabile 295
variifolium 279
ventricosum 146
verecundum 295
verruculosum 280
vescum 10,138
viatorum 295
virens 294
viride 285,291,292

Mesembryanthemum (Cont'd.)

viridicatum 53
viridiflorum 237
vittatum 316
Volckaneri 241
*Watermeyer*i 295
Wettsteinii 51, 95, 96, 99
Woodburniae 295
Wordsworthiae 295
Zeyheri 295
zygophylloides 295

Mestoklema 345, 346

albanicum 346, 350
arboriforme 347, 349
copiosum 346, 348
elatum 347, 349
illegidum 347, 350
tuberosum 346, 347, 349
tuberosum v. *macrorrhizum*
346, 348

Mitrophyllum 265, 268, 269, 270, 281

chrysoleucum 267
clivorum 271, 275
cognatum 271, 274, 275
dissitum 270, 274
grande 270, 271, 274, 281
mitratum 269, 271, 273

Mitrophyllum (Cont'd.)

moniliforme 266
nanum 270, 275
Pillansii 271, 272
pisiforme 267
proximum 270, 272, 273
Schickianum 270, 276

Monilaria 264, 265, 282

chrysoleuca 265, 267
moniliformis 264, 265, 267, 282
pisiformis 265, 266
scutata 267

Mossia 284, 288

intervallaris 284, 289

Muiria 172

Hortenseae 172, 173, 175

Nananthus 78, 86, 299, 300, 313, 314, 315

albinotus 311
albipunctus 310, 313
aloides 315, 317

Comptonii 311

Peersii 320

Pole Evansii 315, 317

rubrolineatus 315, 318, 319

vittatus 314, 315, 318

Octopoma 285, 286, 287

Octopoma (Cont'd.)

abruptum 287,288

inclusum 287

octojuge 285,287

Odontophorus 160

Marlothii 160

Oophytum 81,104,172

oviforme 104,105

Opathalmophyllum 184

Marlothii 184

Opophytum 79

aquosum 248

dactylinum 248

festigiatum 248

Forskahlia 248

speciosum 248

Oscularia 278,284

deltoides 284

Perissolobus 300,323

Bijlila 324

Phyllobolus 82,226,252

Lesliei 248

pubicalyx 248

resurgens 248

Phyllobus 248,252

Piquetia 84,86

Platythyra 78,79,250,252

Platythyra (Cont'd.)

Haeckeliana 253

pallens 250

Pleiospilos 84,147,152,176,224,258,
259

Bolusii 147,148,150,224,258,259

compacta 225

nobile 225

Furpusii 260

simulans 148,224,258,259

Polymita 285

Pearsoni 285

Prenia 79,82,249

intervallaris 289

pallens 250

relaxata 250

Prepodesma 301,324

Orpenii 325,326

uncipetala 325

Psammophora 181

Psilocaulon 82,226

absimile 248

acutisepalum 248

album 248

arenosum 248

articulatum 248

asperulum 248

Bijliae 248

Psilocaulon (Cont'd.)

caducum 248
clavulatum 248
corallinum 248
coriarium 248
densum 248
dimorphum 248
Dinteri 248
diversipapillosum 248
fasciculatum 248
fimbriatum 249
Gessertianum 249
glareosum 249
granulicaule 249
junceum 249
leptarthron 249
Levynsiae 249
luteum 249
melanospermum 249
mentiens 249
micranthum 249
mucronulatum 249
namaquense 249
Pageae 249
parviflorum 249
pfeilii 249
pubescens 249

Psilocaulon (Cont'd.)

salicornioides 249
Schlichtianum 249
simile 249
squamifolium 249
subnodosum 249
tenue 249
Trothai 249

Punctilaria 81,85,151,157,224,225,
258,259,262

Bolusii 259
canum 260
compacta 153,155,158,225,259,260
Dekenahi 224
magnipunctata 152,153,155,224,259,
260
magnipunctata v. sesquiuncialis 259
optata 153,155,224,260,262
Purpusii 260
Roodiae 152,157,224
sesquiuncialis 259
simulans 259
sororia 153,154

Rabiea 300,308

albinota 309,310
albipuncta 309,313
carolinensis 309,310
cibdela 310,312

Rabiea (Cont'd.)

Lesliei 310,312

tersa 309,311

Rhinephyllum 180

Muiri 181,182

Pillansii 182

Rimaria 81,113,116,171,255,256

dubia 114,115,116

Heathii 113,114,115,116

microsperma 171,256

Pole Evansii 114,117,171,256

Roodiae 114,116

Roodia 84,130,132

digitifolia 131,132,229

Ruschia 277,278,279

acuminata 279

ampliata 279

androsacea 279

armata 279

atrata 279

Barnardii 279

bicolorata 279

Bijliae 279

brevipes 279

Britteniae 279

calycina 279

cleista 279

Ruschia (Cont'd.)

Comptonii 279

concava 279

concinna 279

connata 279

crassuloides 279

cymbifolia 279

decumbens 279

decurrens 279

Dejagerae 279

diversifolia 279

dualis 293

Dyeri 279

elineata 279

Fergusoniae 279

filipetala 279

Fourcadei 279

Framesii 279

gemina 279

glauca 279

Goodiae 279

gracilis 279

hamatilis 279

Herrei 279

hexamera 279

Hutchinsonii 279

inclusa 279

Ruschia (Cont'd.)

inconspicua 279
incurvata 279
insidens 279
integra 291
intervallaris 284,289
laxipetala 279
Leipoldtii 279
longipes 279
lutea 279
maleolens 279
Maxwellii 279
Meyeri 279
micropetala 279
molle 279
muricata 279
mutica 279
namaquana 280
nana 280
nivea 280
obtusa 280
papillata 280
parvibracteata 280
patens 280
Peersii 280
perforata 280
phylicoides 280

Ruschia (Cont'd.)

Pillansii 280
piscodora 280
promontorii 280
prostrata 280
pumila 280
pusilla 280
radicans 280
rigida 280
rupicola 278
saturata 280
saxicola 280
Schlechteri 280
senaria 280
staminodiosa 280
stellata 280
stricta 280
stylosa 280
subglobosa 280
succulenta 280
translucens 280
triflora 280
triquetra 280
tuberculosa 280
velutina 280
verruculosa 280
versicolor 280
virens 280

Saphesia 341

flaccida 341

Sceletium 79, 226

Semnanthe 160

lacera 160

Smicrostigma 285, 290

viride 291

viridis 285

Sphalmanthus 82, 235

Sterropetalum 227, 231

Pillansii 228

Synaptophyllum 79

Juttae 249

Sladenianum 249

Thyrasperma 79, 281

Titanopsis 181, 301, 303, 305, 315

calcareo 306, 307

crassipes 306, 307

Hugo-Schlechteri 305

Luderitzii 304

Schwantesii 304, 305

spathulata 306, 308

Trichocyclus 82

Trichodiadema 278, 281, 283

barbatum 283

stelligerum 283

Vanzijlia 282

Vanzijlia (Cont'd.)

angustipetala 282

Verrucifera 300, 302

Hugo-Schlechteri 303, 304

Luderitzii 303, 304

Schwantesii 303, 304, 305

Zeuktophyllum 161

suppositum 161

